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VOLUME IX

AUGUST, 1921–OCTOBER, 1921

PUBLISHED MONTHLY UNDER THE DIRECTION OF

THE BOARD OF CONTROL OF BOTANICAL ABSTRACTS, INC.

A democratically constituted organization, with members representing many societies interested in plants.

BALTIMORE, U. S. A.

WILLIAMS & WILKINS COMPANY

1921

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Entry 90. *For* Le Plastrier, G. M. *read* Le Plastrier, C. M.
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AUGUST, 1921 — No. 1

ENTRIES 1–576

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Vol. IX AUGUST, 1921 No. 1

ENTRIES 1-576

BOTANICAL ABSTRACTS

AGRONOMY

C. V. PIPER, *Editor*
MARY R. BURR, *Assistant Editor*

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1. ANONYMOUS. **El abrojo grande.** [Cocklebur] Defensa Agric. [Uruguay] 1: 10-12. 1920.—*Xanthium* sp. as a weed.—*John A. Stevenson.*

2. ANONYMOUS. **El maiz para semilla. Ventajes de la seleccion de las espigas. [Seed corn. Advantages of selecting ears.]** Defensa Agric. [Uruguay] 1: 295-300. *10 fig.* 1920.

3. ANONYMOUS. **Field experiments, 1920.** Jour. Dept. Agric. Ireland 21: 53-68. 1921.—Average results are presented of: Variety tests with barley, potatoes, mangels, oats, turnips, and wheat; fertilizer tests with potatoes, mangels, oats, and wheat; cultural tests with potatoes; and weed-spraying tests in oats. Comparisons are made with previous year or years.—*Donald Folsom.*

4. ANONYMOUS. **La papa y su cultivo.** [Potato culture.] Defensa Agric. [Uruguay] 1: 2-6. 1920.

5. ANONYMOUS. **Potatoes.—Varieties immune from black scab or wart disease.** Jour. Dept. Agric. Ireland 21: 108-112. 1921.—Some immune varieties are satisfactory in regard to yield. Yield rate and immunity of a number of varieties are given.—*Donald Folsom.*

6. ANONYMOUS. **Report of the work of the seed propagation division for 1920.** Jour. Dept. Agric. Ireland 21: 38-52. *Fig. 1-4.* 1921.—Results of pure-line culture and variety tests of wheat, oats, barley, and flax are described. Covered smut (*Ustilago hordei*) of barley was eliminated by steeping the seed for 10 minutes in a 5 per cent solution of formalin.—*Donald Folsom.*

7. ANONYMOUS. **The non-setting of the uba seed.** South African Sugar Jour. 5: 131. 1921.—Success with cross pollinating flowers of sugar cane and raising of seed in Natal and Zululand cannot be expected with our present knowledge as the anthers appear to have lost the power to open. The pollen is remarkably scanty in the anthers; such pollen grains as are present are irregular in size and devoid of starch whereas normal cane pollen is spherical and rich in starch. From these latter facts the conclusion is drawn that the pollen is sterile.—*E. K. Tisdale.*

8. Anonymous. **The R. A. S. field wheat competition.** Agric. Gaz. New South Wales 32: 185-190. 1921.—Of 54 original competitors 24 voluntarily withdrew. Fields were scored according to trueness to type and purity, freedom from disease, evenness, cleanliness, condition and appearance, and apparent yield. A field of Hard Federation sown May 6 on summer fallow at 45 pounds per acre with no fertilizer won first place.—*L. R. Waldron.*

9. Arnold, J. H. **Farm practices in growing wheat.** U. S. Dept. Agric. Yearbook 1919: 123-150. *Pl. 5, 20 maps.* 1920.—A geographical presentation of farm practices in wheat growing in the U. S. A. The practices used in preparation of seed bed, sowing, harvesting and threshing, have a rather definite adjustment to areal factors of climate, soil, and topographic features. Local variation in factors causes an adaptation of methods. Practices suitable for any given areal conditions cannot be transplanted unmodified to another area but helpful suggestions may be secured.—*C. J. Shirk.*

10. Beckman. **Neuere Erfahrungen über Strohaufschliessung und Lupinenentbitterung. [New experiments in treating straw and in removing the bitter principle from lupines.]** Mitteil. Deutsch. Landw. Ges. 36: 145-146. 1921.—After a brief summary of the older attempts to treat straw to make of it a more digestible feed, the author describes his own method. The straw is treated with soda combined with hydrated lime. The process is carried on in a patented apparatus without artificial heat. This apparatus is described and an estimate of expenses given by an engineer, Baetke of Charlottenburg. Out of 100 kg. straw, 80 kg. "Beckman straw" are obtained, with a starch value of 56 kg. The details of the quantities of soda and lime are not given but Baetke claims that at a total expense of 70 M. for raw material and labor a feed worth 275 M. may be secured. To the costs should be added the royalty for the use of the patent, which is fixed at 70 M. per head of cattle payable once (einmalige Abgabe).—*A. J. Pieters.*

11. Bippart, E. **Erfahrungen in Ackerbau zur Überwindung der Kriegschäden für Gross- und Kleinbetrieb. [Experiences in agriculture for overcoming war damages by large and small estates.]** Landw. Hefte 44/45. *74 p., 4 fig.* 1920.—A series of agricultural essays by an experienced farmer. The subjects discussed are as follows: 1. Agricultural production. Nutrition of plants and their ingredients. 2. The difficulties of managing sandy lands and how to overcome them. 3. The difficulties of cattle raising on sandy land. 4. The management of moor lands and the Rimpau-Cunrau system. 5. Practical agriculture on stiff soils. 6. What results have the scientific investigators secured as regards fallowing? 7. How can the nitrogen requirement of winter grain on stiff land be met without manuring? 8. Soil bacteria. 9. Management of stiff soils without livestock. 10. The art of agriculture. 11. Practical rotations with fallow, clover, and hoed crops. 12. How can tillage be conducted to bring about a restoration of a brisk and strong soil fermentation. 13. Conclusion.—*C. V. Piper.*

12. Bovell, J. R. **Report on the Department of Agriculture, Barbados.** Rept. Dept. Agric. Barbados 1917-1918: 51 p. 1920.—From a summary of the results of experiments with sugar-canes during the period 1916–18 it appears that B. H. 10 (12), Ba. 6032, and Ba. 7924 have maintained a high standard of yield and that the newer seedlings, such as B. S. F. 12 (45), B. S. F. 12 (34), B. S. F. 12 (27), and B. S. F. 12 (24), are deserving of extended trials under plantation conditions. The results of manurial experiments with sugar-cane were rendered of little value by the attacks of *Diaprepes abbreviatus* L. and *Phytalus smithi* Arrow.—Two series of experiments with cotton are reported: (1) An effort to improve Sea Island and certain indigenous and other varieties of cotton by the selection of the best formed plants giving heavy yields of good-quality lint; (2) by similar means to improve a number of hybrid cottons obtained from crossing improved varieties with indigenous cottons.—The Barbados cassava (*Manihot utilissima*) seedling No. 101 gave a mean return per acre of 11,026 lbs. over a 5-year period. Results of experiments with Xanthosomas and Colocasias prove that better returns are obtained when the former are planted from corms and the latter from cormels. Variety experiments with a number of legumes, yams, and three fodder plants are also reported. Figures are given for the sugar and cotton crops.—*J. S. Dash.*

13. Breakwell, E. **Further reports on Shearman's clover.** Agric. Gaz. New South Wales 32: 167. 1921.—Kew authorities announce plant to be *Trifolium fragiferum* var. Notes on its behavior are given.—*L. R. Waldron.*

14. Breakwell, E. **Popular descriptions of grasses.** Agric. Gaz. New South Wales 32: 191-196. *3 fig.* 1921.—Descriptive notes are given of *Stipa setacea, S. scabra, Aristida Behriana,* and *A. leptopoda.* Other species are mentioned. Seeds of the 2 *Stipa* species germinate 48 hours after rains. The 2 grasses start very early after dormancy and resist drought in summer which makes them valuable for dry-land pastures.—*L. R. Waldron.*

15. Brooks, A. J. **Report on the Agricultural Department, St. Lucia.** Imp. Dept. Agric. West Indies Rept. Agric. Dept. St. Lucia 1918-19. 32 p. 1920.—Notes are given on: *Pycnostachys dawei,* a handsome blue-flowered labiate from Uganda, Guayaquil cacao, now in great demand on the British market and of which seeds have been received for trial; *Ilex paraguayensis,* extensively used as a tea plant in Paraguay; and *Nephelium lappaceum,* which bears the Rambutam,—a favorite fruit of the Malayan Archipelago.—It was found that *Dolichos hosei* was easily propagated by cutting off a few rooting branches and establishing them in clay pots. Upland, or Hill, rice gave satisfactory results and should become an important subsidiary crop. Maize of a St. Vincent strain yielded 3206 lbs. air-dried grain per acre. A large plot of the Gambia variety of ground nuts, gave a yield of 2643 lbs. cured nuts per acre.—Plant legislation includes measures to prevent the introduction of the mottling disease of sugarcanes, 'wither-tip' of lime trees caused by *Gloeosporium limetticolum,* and the red-ring disease of coconuts.—Progress of the following industries is reported on: Sugar, bay oil, rice, lime, coconut, bee-keeping, cacao, drugs, and spices. A list of the principal exports for the years 1916-18 inclusive is found on page 16. An account is also given of efforts to increase the quantity and improve the quality of locally-grown foodstuffs as a result of conditions imposed by the war.—*J. S. Dash.*

16. Bryce, H. **Field experiments, 1920. Grafton experiment farm.** Agric. Gaz. New South Wales 32: 168-170. 1921.—In the wheat variety trial the varieties yielded in order as follows: Canberra, Marshall's No. 3, Thew, and Hard Federation.—In the winter-fodder trial Sunrise oats mixed with vetches and mixed with field peas gave the best yields, followed by Guyra oats mixed with legumes.—In winter-fodder manurial trial, superphosphate at rate of 200 lbs. per acre gave largest net-increase return.—*L. R. Waldron.*

17. Burt, R. C. **Flax in the United Provinces.** Agric. Jour. India 15: 616-619. 1920.—It is stated that experiments made at the Cawnpore Experimental Farm proved that flax can be successfully grown in the canal-irrigated tracts of the United Provinces. Both English and Japanese seed grew well.—*J. J. Skinner.*

18. Chen, Chunjen C. **[The Pedigreed Seed Co.]** Hua-Shang-Sha-Chang-Lien-Ho-Hui-Ki-Kan [China Cotton Jour.] 2^1: 245-250. *2 pl.* 1921.—[Text in Chinese.] The organization and management of the Pedigreed Seed Company, of Hartsville, South Carolina, are described. The method used by the company in cotton breeding is related at length with graph.—*Chunjen C. Chen.*

19. Collens, A. E., et al. **Sugar-cane experiment in the Leeward Islands. Report on experiments conducted in Antigua and St. Kitts-Nevis in the season 1918-19.** Imp. Dept. Agric. West Indies Rept. Sugar Exp. Leeward Islands 1918-19: 62 p. 1921.—In the 1st part the author reports on the varieties making the best yields for the period under review and also gives those varieties that made the best yields over periods of from 11 to 18 years. The report covers trials in St. Kitts, Nevis, and Montserrat, and includes results secured from certain new seedlings. Part II gives conclusions drawn from manurial experiments.—*J. S. Dash.*

20. Cox, J. F. **The Michigan plan for distributing improved crop varieties.** Jour. Amer. Soc. Agron. 13: 82–84. 1921.—The plan includes varietal testing, plant breeding, corn improvement, the provision of large increase fields, and the help of extension specialists and county agents. A crop improvement association and a farm bureau seed department also cooperate.—*F. M. Schertz.*

21. Cross, W. E. **The distance apart in which cane rows should be planted.** Louisiana Planter and Sugar Manufacturer 65: 233–235. *1 fig.* 1920.—The 3-year results obtained in Tucuman with cane planted in rows 0.9–2.5 m. apart agree in general with those secured at an earlier period in Louisiana, namely, the closer the rows, the greater the tonnage obtained per acre of sugar cane and sugar. Cane should be planted in rows as close together as will permit mechanical cultivation.—*C. W. Edgerton.*

22. Dawe, M. T. **Columbian Pita fibre.—Part II.** Tropic Life 17: 2–4. 1921.—The Pita fiber is of excellent quality and should sell readily for as much as henequen of Yucatan. Certain manufacturers of fiber products have offered to take the entire output of the "pitales" of Chiriguana for 3 years at the current market price of sisal. The chief drawback to the utilization of Pita fiber is the lack of machinery for efficient extraction of the fiber. It is estimated that 40 per cent of the fiber is lost by the present crude methods. A machine for extracting the fiber is being constructed in New York according to plans developed by the author. It is estimated an acre of land will support 5,000 Pita plants; each plant produces 30 leaves per year in 2 cuttings. A conservative estimate places the yield of dry fiber under improved mechanical processes of extraction at 3,060 lbs. per acre.—*H. N. Vinall.*

23. Downing, R. G. **Thick or thin seeding for wheat.** Agric. Gaz. New South Wales 32: 205. 1921.—Recommendations are made as to proper rate of seeding.—*L. R. Waldron.*

24. Grimme, C. **Über einige Hülsenfrüchte aus der Levante und aus Kamerun. [Leguminous plants from the Levante and Kamerun.]** Zeitschr. Untersuch. Nahrungs- u. Genussmittel 40: 37–41. 1920.

25. Guthrie, F. B. **Analysis of Saltbush.** Agric. Gaz. New South Wales 32: 207–210. 1921.—Ash analyses are given of *Atriplex leptocarpum* (?), *A. nummularia*, and *Chenopodium triangulare* as possible sources of potash. In the 2 species of *Atriplex* 40 per cent of the pure ash was composed of K_2O. Notes are given on the value of saltbushes for fodder. Analysis shows them to compare favorably with standard fodders.—*L. R. Waldron.*

26. Guthrie, F. B., G. W. Norris, and J. G. Ward. **The influence of atmospheric variations on the weight of bagged wheat.** Agric. Gaz. New South Wales 32: 200–202. 1921.—A bag of wheat was weighed daily for 2 years. Weight and absolute and relative humidity are shown graphically. Variations in weight of wheat, of lesser intensity, were found to correspond with variations in humidity. No coefficients are given and the data are not handled statistically.—*L. R. Waldron.*

27. Harland, S. C. **Manurial experiments with sea island cotton in St. Vincent in 1918-19, with some notes on the control of certain diseases by spraying.** West Indian Bull. 18: 20–33. 1920.—Author draws the following conclusions: (1) Cotton responds markedly to applications of both artificial and organic manures after it has been grown on the same land for a number of years; (2) the size of the crop, leaving pests and diseases out of account, is limited chiefly by the supply of potash in the soil; (3) most cultivated lands of the colony show the rust disease, locally known by the name of "red leaf," which is the characteristic sign of potash exhaustion; (4) phosphate is not to be recommended since the combination of this and potash gave inferior yields to potash alone; (5) cotton-seed meal alone is not to be recommended. The best practice would be to rotate sugar-cane with cotton, using cotton-seed meal and pen manure for the former, and for the latter an artificial fertilizer containing potash; (6) maturity is not affected by manurial treatment; (7) ratio of bolls to flowers is not affected by differences in manurial treatment; (8) in St. Vincent there is great uniformity in the time at which

flowering and bolling begin, reach their maximum, and conclude. The bulk of the 1st crop is picked from the 21st to 24th week from sowing; (9) cotton stainers (*Dysdercus* spp.) being now under control, losses of crop are caused mainly by shedding of buds and bolls, and external-boll and soft-rot diseases. Experiments concerning shedding are not yet concluded. Spraying is useless in the control of external boll disease, but further experiments are needed to determine its effects on the soft-rot disease.—*J. S. Dash.*

28. HEIDUSCHKA, A., UND J. DEININGER. **Beiträge zur Chemie der hochausgemahlenen Mehle und der daraus hergestellten Brote. [Chemistry of highly mealed flour and bread.]** Zeitschr. Untersuch. Nahrungs- u. Genussmittel **40**: 161–191. 1920.

29. HENDERSON, G. S. **Report of the Imperial Agriculturist.** Sci. Rept. Agric. Res. Inst. Pusa 1919–20: 10–30. *3 pl.* 1920.—The report includes details of crop rotation as practiced on the Institute farm; a summary of the results of permanent experiments; details of costs of operations with motorized agricultural implements; and breeding of cattle for milk production. The best results in cattle breeding have been obtained from crossing native Indian cows and Ayrshire bulls. One cow produced 7765 pounds of milk during a lactation period of 10 months.—*Winfield Dudgeon.*

30. JACKSON, T. P. **Report on the Agricultural Department, Antigua.** Imp. Dept. Agric. West Indies Rept. Agric. Dept. Antigua 1918–19: 39 p. 1920.—The author reports: (1) Work in gardens and observations on plants, the latter including notes on *Artabotrys odoratissima, Myroxylon Pereiras*, and *Areca catechu*; (2) work in nurseries and distribution of plants, with notes on *Eucalyptus rostrata*, a tree whose wood bids fair to replace foreign woods for railway sleepers; (3) plot experiments at the Botanic and Experiment Stations,—sweet-potato storage and varietal experiments. In the latter experiment, A12 yielded an average of 13,760 lbs. per acre after 3-years' trial; Light Red (yam) yielded an average of 20,373 lbs. per acre. In experiments with Eddoes and Tannias, Tannia Yellow came first with an average yield of 4,280 lbs. per acre after 11 years of experiment; in the fodder experiments, Pearl Millet and Early Amber sugar corn tied for first place with yields of 24,000 lbs. per acre; (4) cotton selection; (5) fungous pests and their control, with a note on *Marasmius sacchari* attacking sugar-cane; (6) progress in the sugar, cotton, lime, coconut, onion and corn industries; and (7) miscellaneous notes on silos and ensilage, reafforestation, plant legislation, etc.—*J. S. Dash.*

31. JURITZ, CHAS. F. **A South Australian vineyard soil.** Jour. Dept. Agric. Union of South Africa **2**: 137–140. 1921.—The author notes the geological origin of some typical Australian vineyard soils and gives mechanical and chemical analyses of the soil from the Angaston vineyards 40 miles northeast of Adelaide, South Australia.—*A. J. Pieters.*

32. KERLE, W. D. **Farmers' experiment plots. Winter fodder variety trials, 1919-20. Upper north coast district.** Agric. Gaz. New South Wales **32**: 173–180. *5 fig.* 1921.—Trials were carried out on 9 farms in this district. Yields were excellent due to favorable seasonal conditions. A trial showed that the lighter wheat seeding with field peas gave the largest forage yield. Generally wheat and peas gave better yields than wheat alone or oats alone. Oats alone yielded better than wheat alone. Yields of green forage in excess of 15 tons per acre were recorded. Phosphatic manures increased yields in all cases.—*L. R. Waldron.*

33. LEAKE, H. MARTIN. **The Egyptian cotton problem. A report to the Egyptian government.** Agric. Jour. India **15**: 485–501, 595–615. 1920, **16**: 7–18. 1921.—A discussion of a plan of organization for encouraging the development of the cotton industry, and for disseminating improved and pure seed.—*J. J. Skinner.*

34. LEMMERMANN, OTTO, UND KARL ECKL. **Die Rentabilität der Anwendung der künstlichen Düngemittel bei den heutigen Preisen und ihre Bedeutung für die Volksernährung. [The profitableness of using artificial fertilizers at present prices and its meaning for the food supply.]** Mitteil. Deutsch. Landw. Ges. **36**: 177–182. 1921.—A series of tables showing amounts and cost of fertilizers, yields, and values.—*A. J. Pieters.*

35. Lührig. **Ueber den Blausäuregehalt des Phaseolus lunatus. [On the hydrocyanic acid content of Phaseolus lunatus.]** Pharm. Zentralhalle 62: 95-97. 1921.—Twenty shipments of Rangoon beans were examined in which the amount of hydrocyanic acid ranged from 2.3 to 37.7 mg. in 100 g. of beans. This quantity of hydrocyanic acid is not detrimental to health, because practically all of it is lost by washing the beans, boiling in water and discarding the water.—*H. Engelhardt.*

36. Maiden, J. H. **Spread of another bad weed.** Agric. Gaz. New South Wales 32: 202. 1921.—Note is given on *Gilia squarrosa*, California stinkweed.—*L. R. Waldron.*

37. Matenaers, F. F. **O. P. V. Silage.** Mitteil. Deutsch. Landw. Ges. 36: 184. 1921.—A note on oat-pea-vetch silage said to be very satisfactory in Nova Scotia. An average of 12 tons per acre green matter may be secured, and this has a higher dry weight than maize.—*A. J. Pieters.*

38. Matenaers, F. F. **Praktische Erfahrungen mit der Sonnenblumensilage. [Practical experience with sunflower silage.]** Mitteil. Deutsch. Landw. Ges. 36: 154. 1921.—A brief account of success with this silage in Iowa is copied from the St. Paul, Minnesota, "Deutschen Farmer." The sunflowers yielded 20 tons per acre against 10 tons of maize on similar land. In spite of some decay due to imperfect ensiling, cattle ate the silage as eagerly as the maize silage; there was no apparent difference in the flow of milk.—*A. J. Pieters.*

39. Moffet, S. **Conseils practiques pour améliorer la culture de la pomme de terre. [Practical advice to improve the cultivation of potatoes.]** Bull. Sci. Pharm. 27: 638–642. 1920.—Diseases of the potato are discussed and advice is given in regard to the selection of the tubers for propagation.—*H. Engelhardt.*

40. Moore, J. C. **Report on the Agricultural Department, Grenada.** Imp. Dept. Agric. West Indies Rept. Agric. Dept. Grenada 1918-19: 38 p. 1920.—Work of botanical interest falls under 4 heads: (1) Work in gardens and observations on plants, including a note on a guava (Indian White) yielding a fruit weighing 10 oz. and having a circumference of 10 in.; (2) plot and other experiments, with remarks on yam culture, corn storage, edible beans, and Sunn Hemp (*Crotalaria juncea*); (3) progress of industries, giving export figures, etc., of cacao, spices, cotton, and limes; (4) plant legislation.—*J. S. Dash.*

41. Moore, J. C. **Report on the Agricultural Department, Grenada. April-December 1919.** Imp. Dept. Agric. West Indies Rept. Agric. Dept. Grenada 1919: 21 p. 1921.—Plot experiments with Sunn Hemp (*Crotalaria juncea*) and with yam varieties (*Momordica cochinchinensis*) are recorded. The latter grew better from unshelled than from shelled seed. Onions can be successfully and profitably grown under Grenada conditions; experiments gave a yield of 3.38 tons of dried onions per acre. Full account is given of the status of the cacao, spice, sugar, cotton, coconut, and lime industries.—*J. S. Dash.*

42. Neidig, Ray E., Robert S. Snyder, and C. W. Hickman. **Sunflower silage digestion experiment with cattle and sheep.** Jour. Agric. Res. 20: 881–888. 1921.—Feeding experiments and analyses of sunflower (*Helianthus*) silage indicate that it compares very favorably with maize silage. Where both maize and sunflowers can be grown, the selection of a silage crop depends upon comparative tonnage per acre and cost of production.—*D. Reddick.*

43. Pinnow, J. **Über den sauren Charakter des Mehles. [The acid character of flour.]** Zeitschr. Untersuch. Nahrungs- u. Genussmittel 40: 243–246. 1920.

44. Pitt, J. M. **Farmers' experiment plots. Maize experiments, 1919-20. Central coast district.** Agric. Gaz. New South Wales 32: 25–27. 1921.—Maize trials were conducted in cooperation with a number of farmers. With a favorable season, high yields were secured. Improved Yellow Dent, Yellow Horsetooth, Golden Nugget, Leaming, and Manning White

were the best yielders.—In green-manuring trials, corn grown on land following field peas outyielded check plat, and this in turn outyielded maize following barley and vetches. Low yield of the corn was accounted for by the very heavy crop of barley and vetches.—*L. R. Waldron.*

45. Pridham, J. T. **Trials of imported cereals.** Agric. Gaz. New South Wales 32: 171–172. 1921.—Notes are given on varieties of oats, wheat, and barley imported from U. S. A. and Canada. Of 4 oat varieties, O. A. C. 72, Sixty Day, Banner, and Fulghum, only the Fulghum was of promise. Of the wheat varieties Red Fife, Glyndon Fife, Red Rock, Kanred, Kharkov, Fultz, Marquis, Burbank, Super, Yeoman, and Fenman, none was found to be of promise and all were distinctly inferior to Hard Federation. Barley O. A. C. 21 is evidently worthy of further trial.—*L. R. Waldron.*

46. Reynolds, Mark H., W. R. Birks, and H. Bartlett. **Farmers experiment plots. Wheat, oat and barley experiments, 1920.** Agric. Gaz. New South Wales 32: 153–167. *1 fig.* 1921.—In the northwestern district wheat experiments were carried out cooperatively on 15 farms; 15 varieties were involved, averaging about 7 varieties to the farm. Hard Federation and Canberra yielded well; Federation was most commonly attacked by stem rust. Experiments with barley and oats were only partially successful.—In the central western district trials were conducted on 9 farms, 12 varieties being used. Previous fallowing did not affect smut and take-all. Canberra, Hard Federation, and Yandilla King yielded well. Where a comparison was possible wheat for hay was outyielded by oats. The new oats variety, Sunrise, outyielded Algerian by 10 bushels. Results of manurial experiments were inconclusive. In 2 cases out of 3 light wheat seeding gave best yields.—In the western district, trials were conducted on 13 farms, 14 varieties of wheat being used. Canberra, Federation, and Hard Federation yielded best. Guyra oats outyielded Sunrise in 2 cases out of 3. Manurial trials with superphosphate gave increased yields. Oats for hay gave yields equal to or better than those secured from wheat. Large yields of western district are ascribed to favorable weather conditions plus available plant food accumulated during the 2 dry years, 1918 and 1919.—*L. R. Waldron.*

47. Robson, W. **Report on the Agricultural Department, Montserrat.** Imp. Dept. Agric. West Indies Rept. Agric. Dept. Montserrat 1918-19: 52 p. 1920.—The following topics are reported on: (1) Work in the gardens and observations on plants, with notes on *Caryocar nucifera, Tecoma spectabilis, Corypha umbraculifera, Pithecolobium Unguis-cati* (generally the most satisfactory of West Indian hedgeplants, but unfortunately a host of *Cuscuta* sp.), and *Triphasia aurantiola,* which makes a very attractive and shapely hedge. (2) Recent plant importations, including notes on *Canavalia gladiata,* which has proved satisfactory as a green-manure cover crop and for planting between young lime trees, and *Saccharum ciliare* (yielding 20 tons of green matter per acre), which may be grown on waste lands and applied as a mulch for young lime trees. (3) Cotton experiments, including extensive notes on cotton breeding work and cotton manurial experiments. (4) Observations on the lime industry. Under this head are discussed the following principal environmental factors connected with the successful development of lime trees: The amount and distribution of the rainfall,—with which is associated the humidity of the atmosphere,—amount of exposure to prevailing winds, damage from scale insects, damage from root grubs, soil medium in which trees are grown, and the manurial requirements of the trees. (5) Sugarcane variety experiments. (6) Experiments with bay trees (*Pimenta acris*), giving quantities of leaves, results of distillations, etc. (7) Minor crops, including peas, beans, yams,—the latter when grown on stakes yielded 79 per cent more than when grown without stakes,—ground nuts, sweet potatoes,—the variety Red Bourbon yielding after 18 experiments an average of 13,034 lbs. per acre,—onions, papaws, *Datura metel* as a source of Scopolamine, and green manure crops. (8) Diseases, particularly a downy mildew of young lime seedlings which is easily controlled by applying Bordeaux mixture to the plants in the beds. (9) Export figures, etc., on the cotton, lime, sugar, papain, bay oil, and onion industries. (10) Plant legislation.—*J. S. Dash.*

48. Sands, W. N., et al. **Report on the Agricultural Department St. Vincent.** Imp. Dept. Agric. West Indies Rept. Agric. Dept. St. Vincent **1918-19**: 39 p. 1920.—An account is given of manurial experiments with cotton (see Bot. Absts. 9, Entry 27) and with arrowroot. In the latter an average gain of no less than 241 per cent over non-manured plots was attained by mulching with *Gliricidia* prunings. This procedure gives better results than the use of chemical manures.—Certain hybrids of castor oil plant between a type known as *Ricinus Gibsoni* and a St. Vincent native, have given promising plants in F_2, and a very prolific type was selected for culture in F_3. Sown on April 25 on ridges 4 feet apart with 1 foot between the plants, this type flowered in 33 days from sowing. The whole was picked on November 16, at which time the plot had yielded at the rate of 1000 lbs., or nearly 22 bushels per acre.—Recently amended plant legislation provides for the proper inspection and, if necessary, disinfection or destruction of imported plants.—Figures and other details are furnished of the cotton, starch, cacao, sugar, maize, coconut, ground nut, and pea industries.—*J. S. Dash.*

49. Sayer, Wynne. **Report of the Secretary, Sugar Bureau.** Sci. Rept. Agric. Res. Inst. Pusa **1919-20**: 116–119. 1920.—An appendix to the Scientific Reports recounting the steps that led to the formation of a Sugar Bureau by the Government of India, and reporting progress in the collection of information about the sugar industry in India.—*Winfield Dudgeon.*

50. Shepherd, A. N., R. N. Makin, and J. M. Pitt. **Farmer's experiment plots. Winter fodder variety trials, 1920. Murrumbridges irrigation areas.** Agric. Gaz. New South Wales **32**: 77–85. 1921.—Trials were conducted in various districts with barley, wheat, and oats, alone and with vetches and peas. The addition of the legumes ordinarily increased the yields, and the oats seedings generally gave the highest yields.—*L. R. Waldron.*

51. Shepherd, F. R., and W. I. Howell. **Report on the Agricultural Department, St. Kitts-Nevis.** Imp. Dept. Agric. West Indies Rept. Agric. Dept. St. Kitts-Nevis **1918-19**: 35 p. 1920.—Small plot experiments with economic crops, including corn, peanuts, cassava, hill rice, peas, sweet potatoes, yams, and onions, are recorded; also manurial experiments with cotton. For cotton, tables, and curves of flowering, shedding, and bolling are given.—Plant legislation in force in the Presidency is noted; it includes an ordinance prohibiting the exportation of nursery stock or plants to the U. S. A. without certificate from a recognized authority.—The sugar exports show a considerable decrease for the year, owing to drought, while the area in cotton, on account of prevailing high prices, has been remarkably increased. Results with truck crops in Nevis were not, on the whole, as satisfying as those obtained in St. Kitts.—*J. S. Dash.*

52. Stadler, L. J., and C. A. Helm. **Corn in Missouri, I. Corn varieties and their improvement.** Missouri Agric. Exp. Sta. Bull. 181. *51 p.* 1921.—Variety tests of corn on 9 experiment fields and several hundred cooperative variety tests on farms in Missouri, are briefly reported. The practical value of various methods of corn improvement is discussed.—*L. J. Stadler.*

53. Stening, H. C. **Gallipoli wheat under local conditions.** Agric. Gaz. New South Wales **32**: 184. 1921.—Yields are reported on this new wheat variety at Temora Experiment Farm. It ranked 4th when grown with 12 other varieties. It resists lodging and shelling.—*L. R. Waldron.*

54. Stevenson, L. **Meadows and pastures.** Agric. Jour. [British Columbia] **6**: 40, 45. 1921.—Summary of an address to British Columbia Dairymens' Convention.—*J. W. Eastham.*

55. Thatcher, L. E. **Annual white sweet clover.** Monthly Bull. Ohio Agric. Exp. Sta. **6**: 31-32. *1 fig.* 1921.—A report on the tests of this legume as made at the Ohio station. It requires from 153 to 183 days to mature seed in Ohio and about 80 days intervene between seeding and blooming period. Earlier seeding varieties must be developed for Ohio conditions. The relative importance of this legume is as yet problematical.—*R. C. Thomas.*

56. THORNE, C. E. **Thirty-eighth annual report of the Ohio Agricultural Experiment Station.** Ohio. Agric. Exp. Sta. Bull. 338. *7–31.* 1919.—In this report the director gives the work and publications of the various departments of the Station for the year 1918–19.—*R. C. Thomas.*

57. THORNE, C. E., AND CARY W. MONTGOMERY. **County experiment farms in Ohio.** Ohio Agric. Exp. Sta. Bull. 344. *223–478.* 1920.—An account is presented of the rotation and fertilizer experiments carried on at 9 sub-stations. The work reported includes: Drainage experiments at the Clermont County farm; variety tests of corn, oats, soybeans, and wheat at the Hamilton County farm; variety tests of silage corn at the Trumbull County farm; and at the Washington County farm special attention was paid to vegetable gardening, especially to utility work with cabbage, tomatoes, and sweet corn. The crops used in the various rotations were corn, oats, wheat, clover, soy beans, tobacco, potatoes, sugar beets, alfalfa.—*R. C. Thomas.*

58. TICE, C. **The potato in British Columbia.** British Columbia Dept. Agric. Bull. 86. *75 p., 78 fig.* 1921. An information bulletin for growers. It contains a chapter on diseases.—*J. W. Eastham.*

59. TSCHERMAK, ERICH. **Massnahmen zur Gewinnung grösserer Mengen von Mutterkorn. [Measures for securing larger amounts of Ergot.]** Mitteil. Deutsch. Landw. Ges. **36**: 184–185. 1921.—Owing to the high prices paid by dealers in drugs it has become profitable to save the ergot. The author points out that any condition tending to decrease or delay fertilization of the rye, increases the chances for the production of ergot, and he makes some practical suggestions to that end.—*A. J. Pieters.*

60. VENKATRAMAN, T. S., AND R. THOMAS. **The care and treatment of new sugarcane importations.** Agric. Jour. India **16**: 24–31. *Pl. 2–4.* 1921.—The packing of cane pieces for shipment is described and the methods of preliminary germination and necessary precautions against ants are discussed.—*J. J. Skinner.*

61. WIMMER, G. **Über den jetzigen Stand unserer Kenntnisse und Erfahrungen in der Tabakdüngung. [Concerning the present state of our knowledge and experience in tobacco fertilizing.]** Mitteil. Deutsch. Landw. Ges. **36**: 166–167. 1921.—A general statement of current information.—*A. J. Pieters.*

62. ZADE. **Das Knaulgras. [Orchard grass.]** Arbeit. Deutsch. Landw. Ges. 305. *69 p.* 1920.—Two species of *Dactylis* are recognized as occurring in middle Europe, *D. glomerata* L. and *D. Aschersoniana* Graebner; the author concerns himself with the former. Twelve varieties have been described but culture tests have shown that they are not constant. The botanical characters and morphology of the species are described, especially the inflorescence, of which several types are illustrated. Much space is devoted to a discussion of germination. Hand-gathered orchard-grass seed respond to a sudden and sharp fluctuation in temperature. This is not so much the case with seed that have been thrashed or sweated. In field practice not more than 20 per cent of the viable seed can be counted on to produce plants. Culture, feeding value, climatic adaptation, and fertilizers are discussed briefly. Seed production is treated at some length. It is said that for conditions in Germany the home-grown seed is best. In the chapter on breeding attention is called to the difficulty of obtaining a pure line, because no seed can be secured from single select plants by self-pollination. The author's method is. therefore, to start the breeding work with 2 selected plants as nearly alike morphologically and physiologically as possible.—*A. J. Pieters.*

BIBLIOGRAPHY, BIOGRAPHY AND HISTORY

Neil E. Stevens, *Editor*

(See also in this issue Entries 273, 456, 574)

63. Anonymous. **B. E. Fernow.** Forstwiss. Centralbl. 42: 375–380. 1920.—Résumé of an article by Filibert Roth in Amer. Forestry (see Bot. Absts. 6, Entry 958) outlining the part played by Fernow in the forestry movement of America.—*W. N. Sparhawk.*

64. Anonymous. **Die Wittmack-feier der D. G. G. am Donnerstag, den 25. September 1919. [The Wittmack festival of the German horticultural society, Thursday, Sept. 25, 1919.]** Gartenflora 68: 245–254. *Portrait.* 1919.—Speeches and observances in honor of the 80th anniversary of Ludwig Wittmack (born Sept. 26, 1839), with his response, giving a few items of personal history.—*M. F. Warner.*

65. Anonymous. **[John Reader Jackson, 1837-1920.]** Nature 106: 511. 1920.—Jackson published botanical articles in various journals, as well as Commercial Botany of the Nineteenth Century (1890); he also edited Barton and Castle's British Flora Medica (1877).—*O. A. Stevens.*

66. Anonymous. **Prix et subventions attribués en 1920. Académie des Sciences, Paris. [Prizes and grants awarded in 1920 by the Paris Academy of Science.]** Compt. Rend. Acad. Sci. Paris 171: 1262–1343. 1920.—A list of the awards is given and in connection with each a brief review of the scientific achievements of the recipient. The following are the botanists and the prizes which they received: August Chevalier, Fondation Tchihatchef; H. Herissey, Prix Jecker (shared with Gault); Albert Maublanc, Prix Desmazières; Lucien Hauman-Merck, Prix de Coincy; Pierre See, honorable mention; Paul Bertrand, Prix Saintour.—*C. H. Farr.*

67. Anonymous. **The organization of the Indian Botanical Society.** Jour. Indian Bot. $1^{9/10}$: [2 p.] 1920 [1921].—At the Nagpur meeting of the Indian Science Congress, January 1920, the Botany section decided to organize an Indian Botanical Society, with the encouragement of research as its primary aim. On December 14, 1920, the membership numbered 71. The officers are: Winfield Dudgeon, President; W. Burns, Vice-President; Shiv Ram Kashyap, Secretary-Treasurer; and Birbal Sahni and K. Rangachari, Councillors.—*Winfield Dudgeon.*

68. Anonymous. **Sir D. E. Hutchins.** Nature 106: 540–541. 1920.—Hutchins died in New Zealand at the age of 70. His forestry work in India, South Africa, and Australia is noted.—*O. A. Stevens.*

69. Abbay, Richard. **Our orchards; letters to the East Anglian Daily Times, 1892-1920, with notes.** *35 p.* W. H. Harrison: Ipswich [1920].—Hargrove's History of Knaresborough (1789) says the original Ribston Pippin was raised from an apple brought from France, and that trees propagated from it were then to be found in nearly every orchard in the county. It was in 1709 that Sir Henry Goodricke, then owner of Ribston Hall, was traveling in Normandy, and took home the pips of a fine apple, from one of which came the original tree. This was blown down about a hundred years ago, but a shoot from the old stump was still living, and bearing a few apples each year, as late as 1909. The Blenheim Orange originated as a seedling in the garden of a cottager named Kempster at Woodstock, about 1792, and for many years his name was locally associated with the apple.—*M. F. Warner.*

70. Beringer, G. M. **The centenary of pharmaceutical education in America.** Amer. Jour. Pharm. 93: 75–104. *Illus.* 1921.—A review of the progress of pharmaceutical education in America during the past hundred years. The organization and progress of the Philadelphia College of Pharmacy, founded on February 23, 1821, as the Philadelphia College of Apothecaries, is described, and accounts are given of a number of personages who aided in its development. The article is illustrated with portraits of some of these persons, together with photographs of different buildings occupied by the college.—*Anton Hogstad Jr.*

71. Britten, James. Henry William Lett (1838-1920). Jour. Botany 59: 75–76. 1921.—An account of the Irish botanist Canon Henry William Lett, born at Hillsborough in 1838, educated at Trinity College, Dublin, ordained in 1871, and after occupying various posts, rector of Aghaderg 34 years. His botanical work was mainly with mosses and hepatics. A list of his more important papers is given.—*K. M. Wiegand.*

72. Britten, James. Thomas Walter (1740?-88) and his grass. Jour. Botany 59: 69–74. 1921.—A summary of materials regarding Walter's life and herbarium. His Flora Caroliniana (1788) was published by the elder John Fraser, who gives the fullest account of Walter's botanical work in his Short History of Agrostis Cornucopiae (1789). This was the *Cornucopiae perennans of* Walter (now called *Agrostis perennans*), which he and Fraser attempted to exploit in Europe as a valuable agricultural grass.—*K. M. Wiegand.*

73. [Britten, James.] William Whitwell. Jour. Botany 59: 84–85. 1921.—A brief account of the life and writings of Whitwell (1839–1920), who though not a critical botanist, was a careful observer and collector. His herbarium has been given to the Birmingham Museum.—*K. M. Wiegand.*

74. Carrier, Lyman. Dr. John Mitchell, naturalist, cartographer, and historian. Ann. Rept. Amer. Hist. Assoc. 1918: 199–219. 1921.—John Mitchell (died 1768) came to Virginia about 1700 and returned to England early in 1746. He wrote Dissertatio brevis de Principiis Botanicorum et Zoologorum (1738) and Nova Plantarum Genera Virginiensium (1741), which were published in Acta Academiae Naturae Curiosorum (1748). He corresponded with Linnæus, Collinson, Bartram (whom he visited in Pennsylvania), and other naturalists of his day. He wrote several other scientific papers, but his principal works were on American affairs. He made the best map of North America of colonial times, which was used by the peace council at the close of the Revolution. With it was published anonymously The Contest in America between Great Britain and France (1757), which, with The Present State of Great Britain and North America (1767), also issued anonymously, is definitely attributed to Mitchell in American Husbandry (London, 1775). Carrier proceeds to show that John Mitchell must also have been the author of An Account of the English Discoveries and Settlements in America, in the revised edition of Harris' Collection of Voyages and Travels, vol. 2, 1748; also of A New and Complete History of the British Empire in America (1756), and, finally, of American Husbandry, "By an American," which was published after Mitchell's death in 1775.—*M. F. Warner.*

75. Christ, Hermann. Der Briefwechsel der Basler Botaniker des 18. Jahrhunderts Achilles Mieg, Werner de La Chenal und Jacob Christoph Ramspeck mit Albrecht von Haller. [Correspondence of the 18th century Basel botanists Mieg, La Chenal, and Ramspeck with Haller.] Verhandl. Naturf. Ges. Basel 21: 1–59. 1918.—A collection of 59 letters from Haller to Mieg, covering the period Nov., 1755, to Dec. 3, 1777, is in the library of the University of Basel, while 27 of Mieg's own letters to Haller were published by the latter in his Epistolae ab Viris eruditis (Bern, 1773–75), vol. 4–6. The letters from Haller to La Chenal have been preserved in the Schonauer family, while those of La Chenal to Haller, covering the period 1759–1772, are included in the Epistolae vol. 3–6. These two groups of correspondence are rich in botanical interest, and have been abstracted with great thoroughness, with addition of explanatory notes in regard to the plants and authorities mentioned. By way of introduction brief outlines are given of the life and principal publications of Mieg (1731–1769), La Chenal (1736–1800), and Ramspeck (born 1722). The latter was a pupil of Haller at Göttingen, but his letters between 1748 and 1756, included in the Epistolae vol. 1–4, offer only a few items of botanical importance.—*M. F. Warner.*

76. Christ, Hermann. Zur Geschichte des alten Gartens. V. [Contributions to the history of old-time gardens.] Basler Zeitschr. Gesch. u. Altertumsk. 17: 370–385. 1918.—Continuing a series of papers in vol. 14–16 of the same journal (1915–17), the author discusses the origin and introduction in Switzerland of certain garden plants. He takes up *Rosa centifolia* and

several bulbs and ornamentals as noted by Clusius; North American plants introduced into Europe in the 17th century as noted by Barrelier; *Vicia faba* in Switzerland and South Germany; notes on cultivated plants and their vernacular names from Zermatt; with other items supplementary to his previous papers.—*M. F. Warner.*

77. Gee, Wilson. **South Carolina botanists: biography and bibliography.** Bull. Univ. South Carolina 72. *52 p., portraits.* 1918.—John Lawson (died 1712), Mark Catesby (about 1679–1749), Alexander Garden (about 1728–1791), William Bartram (1739–1823), Thomas Walter (about 1728–about 1788), John Drayton (1766–1822), John L. E. W. Shecut (1770–1836), James Macbride (1784–1817), Stephen Elliott (1771–1830), Henry W. Ravenel (1814–1887), Lewis R. Gibbes (1810–1894), Francis Peyre Porcher (born 1825), Joseph Hinson Mellichamp (1829–1903).—*Neil E. Stevens.*

78. Hay, T. **A rare work on alpines.** Gard. Chron. III, 68: 285. 1920.—Practical Hints on the Culture and General Management of Alpine or Rock Plants, by James Lothian (Edinburgh, W. H. Lizars, 1845), is probably the first book on this subject published in Great Britain, and contains an extensive and interesting catalogue of 17 pages of plants suitable for rock gardens.—*M. F. Warner.*

79. H[ewitt], J. **William Tyson.** South African Jour. Nat. Hist. 2: 288–290. *Portrait.* 1920.—Tyson died at Grahamstown, April 14, 1920, in his 71st year. He collected the flora of South Africa for nearly 45 years, his material from East Griqualand, Pondoland, and Murraysburg being specially important. The most complete set of his plants is in the Cape Government herbarium. *Tysonia*, a genus of Boraginaceae, was dedicated to him by Dr. Bolus.—*M. F. Warner.*

80. Johnson, D. S. **The Cinchona Station.** Bot. Gaz. 69: 347–348. 1920.—This Jamaican Station will be available for American botanists this year. Located at 5000-feet elevation on the southern slope of the Blue Mountains, its dry, sunny slope offers epiphytic and xerophytic varieties, while the moist northern slope produces liverworts, mosses, and ferns.—Botanists studying lowland plants have use of Hope Gardens and the seacoast produces vegetation of ecological interest.—*E. A. Fenner.*

81. Linné, Carl von. **Caroli Linnaei Adonis stenbrohultensis, utgiven af Felix Bryk.** *12 mo, 13+[28] p.* Björck & Börjesson: Stockholm, 1920.—See Bot. Absts. 6, Entry 1464.

82. McCubbin, W. A. **Abstracts of Canadian plant disease literature.** Ann. Rept., Quebec Soc. Protection of Plants 11: 72–83. 1919.—A list, in alphabetical order by authors, of 220 articles on plant diseases published in Canadian bulletins or periodicals up to the end of 1918. A short explanatory note of the contents is given with each entry.—*J. H. Faull.*

83. Marquart, U. **Jagdliche und forstliche Zustände in Württemberg im 18. Jahrhundert.** [**Forest conditions in Würtemberg in the 18th century.**] Allg. Forst- u. Jagdzeitg. 95: 263–266. 1919.—A brief sketch of the development of game propagation and forestry in Würtemberg during the 18th century.—*Joseph S. Illick.*

84. Payne, C. H. **Old French gardening books.** Gard. Chron. III, 63: 215–216. 1918.—Many English books, usually known only under the name of their translators, are actually of French origin; among others the following are identified: The Grete Herball with Le Grant Herbier en Francoys (1520?); Mascall, A Booke of the Arte and Maner how to Plant and Graffe all Sortes of Trees with Brossard, L'Art et Manière de Semer Pépins et de Faire Pépinières (1552); Surflet's Maison Rustique (1600) with that of Estienne; Evelyn's The French Gardiner with Le Jardinier Francois by Nicolas de Bonnefons; The Art of Pruning Fruit Trees (1685) with L'Art de Tailler les Arbres Fruitiers (1678) by Nicolas Venette; The Theory and Practice of Gardening (1712) by John James, with Dezallier d'Argenville, La

Theorie et la Pratique du Jardinage (1709); Fleetwood's Curiosities of Nature and Art in Husbandry and Gardening (1707) with the Curiositez de la Nature et de l'Art sur la Végétation of the Abbe Vallemont (1705).—*M. F. Warner.*

85. RUSSELL, E. J. **[Prof. Italo Giglioli.]** Nature 106: 573. 1920.—Obituary of this noted teacher and investigator in agriculture who died Oct. 1, 1920.—*O. A. Stevens.*

86. SAVELLI, MARTINO. **La vendita dell' erbario di Giuseppe Raddi. [The sale of Raddi's herbarium.** Bull. Soc. Bot. Ital. **1918**: 3–8. 1918.—Scope and condition of the herbarium were carefully investigated by Gaetano Baroni, head gardener of the Botanical Garden at Florence, and its purchase for the University of Pisa was urgently recommended by Savi. It comprised rare plants from Brasil and Madeira, with others from Australia, Cape of Good Hope, and the East Indies, which had been obtained by exchange from Brown, Sieber, Mayen, and other correspondents. It was also rich in groups and genera on which Raddi had specialized, such as grasses and cryptogams, *Melastoma* and *Piper.* It reached Pisa about March, 1830, and was incorporated by Savi with the University herbarium. About the same time, also, Raddi's Egyptian collections were received, the botanical portion being turned over to Savi for the herbarium, while the zoological portion was divided between the museums of Pisa and Florence.—*M. F. Warner.*

87. SENN, GUSTAVE. **Prof. Dr. Hermann Vöchting.** Verhandl. Naturf. Ges. Basel 30: 1–9. *Portrait.* 1919.—Vöchting was born at Bromberg, Feb. 8, 1847, and trained as a gardener. Going as a young man to the botanical garden at Berlin he came under the influence of Professor Alexander Braun, which led him to study botany under Braun, Pringsheim, and Kny; he took his degree at Göttingen in 1873. The following year he became lecturer at Bonn, where he zealously carried on his investigation of morphological problems by the experimental method. As a result of the publication of his researches in Pflüger's Archiv in 1877, he was called to the chair of botany at Basel in 1878, succeeding his friend Pfeffer, who had been called to Tübingen. In 1887 he was again called to succeed Pfeffer at the University of Tübingen, where he remained until his death, Nov. 24, 1917. His botanical work is summarized, and a list of 34 publications by him is appended.—*M. F. Warner.*

88. SPRAGUE, T. A., AND JAMES BRITTEN. **The botany of the "Herald." (Bibliographical note. LXXXIII).** Jour. Botany 59: 22–24. 1921.—The date of issue and limits of each of the 10 parts (1852–1857) has been worked out by Sprague for The Botany of the Voyage of H. M. S. 'Herald,' by Berthold Seeman. Britten has appended a list of the various botanists who assisted in the work, with their respective contributions.—*K. M. Wiegand.*

89. VINES, S. H., AND DRUCE, G. C. **An account of the herbarium of the University of Oxford, Part II.** *p. 21–66.* Clarendon Press: Oxford, 1919.—Beside the additions to the herbarium, there is a list of collectors represented, often with dates of birth and death or other biographical information.—*Neil E. Stevens.*

90. WATERS, C. E. **More about early days of the American Fern Society.** Amer. Fern Jour. 11: 16–19. 1921.

91. WATTS, FRANCIS. **Tropical department of agriculture with special reference to the West Indies.** West Indian Bull. 18: 101–133. 1920.—This paper, reproduced from the Journal of the Royal Society of Arts for Feb. 20 and 27, 1920, deals with the Imperial Department of Agriculture for the West Indies, and notably the evolution of the various agricultural institutions from the smaller botanical gardens, and the part the larger institutions have played in the economic development of the colonies. Through the scientific study and development of already existing industries, such as sugar, and the fostering of others, such as cotton, a condition of depression has gradually given place to prosperity. Methods of study and control of the pests and diseases attacking staple crops and the difficulties encountered are also fully dealt with.—*J. S. Dash.*

92. Wilson, James. **Improved varieties and larger crops.** Jour. Dept. Agric. Ireland 21: 18–25. 1921.—Account of European conditions from 1653 to the present.—*Donald Folsom.*

93. W[right], C. H. **Drawings of Indian plants.** Roy. Bot. Gard. Kew. Bull. Misc. Inform. 1919: 207–208. 1919.—Kew has a set of about 600 drawings, most of which appear to have belonged to Claude Martin (1731–1800), officer of the East India Company and later major-general in the Bengal Army. Most of the plants are named by William Roxburgh, who received material for his Flora Indica from Martin, who lived at Lucknow 1776–1800. With this collection are other drawings of plants from the Caucasus or Northern Persia, probably made for Sir Gore Ouseley when ambassador to Persia 1810–1814.—*M. F. Warner.*

BOTANICAL EDUCATION

C. Stuart Gager, *Editor*

Alfred Gundersen, *Assistant Editor*

(See also in this issue Entries 70, 91, 132, 135, 157, 299, 335, 336, 350, 574)

94. Anonymous. [Rev. of: Babcock, E. B., and J. L. Collins. **Genetics laboratory manual.** *xi + 56 p.* McGraw-Hill Book Co.: New York; Hill Publishing Co., Ltd.: London, 1918.] Sci. Prog. [London] 14: 171. 1919.

95. Anonymous. [Rev. of: Bower, F. O. **Botany of the living plant.** *x + 580 p., fig. 147.* Macmillan & Co.: London, 1919.] Sci. Prog. [London] 14: 348–349. 1919.

96. Anonymous. [Rev. of: Gager, C. S. **A laboratory guide for general botany.** 2nd ed., *x + 206 p.* P. Blakiston's Son & Co.: Philadelphia, 1919.] Sci. Prog. [London] 14: 349. 1919.

97. Anonymous. [Rev. of: Neville, H. A. D., and L. F. Newman. **A course of practical chemistry for agricultural students.** Vol. II, Part I. *122p.* Cambridge University Press: 1919.] Sci. Prog. [London] 15: 142. 1920.

98. B., R. A. [Rev. of: Fritch, F. E., and E. J. Salisbury. **An introduction to the structure and reproduction of plants.** *8vo, viii + 458 p., 2 pl., 225 fig.* Bell & Sons: London, 1920.] Jour. Botany 59: 82–83. 1921.

99. Barbey, A. **Le Parc National Suisse. [The Swiss National Park.]** Rev. Eaux et Forêts 58: 353–356. 1920.—The Swiss National Park, comprising 14,000 hectares in the Engadine, was created through the efforts of the Swiss League for the Protection of Nature. Its purpose is not to serve as a mecca for tourists, but as a vast, open-air, scientific laboratory removed from the influence of man and devoted to the free development of vegetable and animal life. Hunting, grazing, and lumbering are prohibited. A Commission of Scientific Study has been established to observe and record all manifestations of nature in the park and, with the aid of a corps of Swiss naturalists, to publish monographs on its geology, fauna, flora, climatology, etc.—*S. T. Dana.*

100. Beaumont, A. B. **The introductory course in soils.** Jour. Amer. Soc. Agron. 13: 79–81. 1921.—The paper is chiefly a discussion of the laboratory work of a course in soils.—*F. M. Schertz.*

101. Borgmann, W. **Ausbau des forstlichen Hochschulunterrichts an der Universität Giessen. [Expansion of the forestry course at the University of Giessen.]** Deutsch. Forstzeitg. 36: 17–18. 1921.—Sometime before the war it was proposed to combine the forest schools at Giessen, Tübingen, and Karlsruhe. The question arose again after the war, and the course at Tübingen was transferred to Freiburg (Baden), but the Hessian government decided to

keep the school at Giessen and to enlarge it considerably by establishing new chairs of applied biology, including forest botany, zoology, and soil science. The school will not confine its work to forestry alone, but will cover such subjects as plants and animals injurious to fields, orchards, and vineyards.—*W. N. Sparhawk.*

102. Caldwell, Otis W., W. L. Eikenberry, and Earl R. Glenn. **Elements of general science. Laboratory problems.** *188 p.* Ginn & Co.: Boston, 1920.—Directions for 68 experiments, about one-fourth relating to plants, with questions and references.—*A. Gundersen.*

103. Caldwell, Otis W. **Contribution of biological sciences to universal secondary education.** School Sci. and Math. 21: 103–115. 1921.

104. Call, L. E. **Prerequisites for agronomy subjects.** Jour. Amer. Soc. Agron. 13: 49–53. 1921.—General botany and chemistry are regarded as prerequisites.—*F. M. Schertz.*

105. Dragendorff, G. **Plant analysis: Qualitative and quantitative.** *English translation from the German by Henry G. Greenish, xvi + 280 p., 11 fig.* G. E. Stechert & Co.: New York, 1921.—This is an anastatic reprint of the English edition of 1883. The work concerns the methods and results of the chemical examination of plant tissues and plant products. Part one comprises 8 chapters on examination of moisture and ash, ethereal and fixed oils, wax, chlorophyll, resins, tannins, alkaloids, glucosides, mucilage, saponin, acids, sugars, amides, inulin, proteins, starch, lignin, cellulose, and many other substances. Tables showing (1) the percentage composition of the constituents of plants mentioned in the book, and (2) the composition of the more important components of plants arranged according to percentage of carbon are given.—*C. S. Gager.*

106. Dunn, S. T. [Rev. of: Bose, G. C. **A manual of Indian botany.** *8vo, xvi + 368 p., 8 pl.* Blackie & Son: Bombay, London, and Glasgow.] Jour. Botany 59: 83–84. 1921.

107. Miller, M. F. **The teaching of soils.** Jour. Amer. Soc. Agron. 13: 71–78. 1921.—The paper sets forth the point of view of the members of the meeting of soil instructors held at Lexington, Kentucky. The college course in soils should carry 5 semester-hours credit and should be called "The Principles of Soil Management." Three lectures, 1 quiz and 1 laboratory period per week should be required. This course should be given in the sophomore year and the prerequisites should include inorganic chemistry, geology, and physics.—*F. M. Schertz.*

108. Schmitt, Cornel. **Botanische Schüler-Übungen nebst Resultaten.** [Botanical exercises for schools, with results.] *4th ed., 42 p.* F. P. Datterer & Co.: Freising, Germany, 1920.—Two hundred exercises with plants beginning with germination and growth.—*A. Gundersen.*

109. Shipley, A. E., et al. **Report of the Tropical Agricultural College Committee.** West Indian Bull. 18: 1–12. 1920.—This report, made by a committee of prominent scientists appointed by the Secretary of State for the Colonies, England, covers the various points in connection with the organization of a Tropical Agricultural College in the British West Indies. Topics discussed are desirability of establishment, situation, incorporation, constitution, curriculum, sugar school, oil technology, financial arrangements, college buildings, etc.—*J. S. Dash.*

110. Sklawunos, C. G. **Die Organization des Forstpersonals in Griechenland und dessen Ausbildung.** [Organization and training of the forestry personnel in Greece.] Forstwiss. Centralbl. 42: 443–450. 1920.—The forest administration has been handicapped since its inception (1836) by the lack of trained personnel. Forest protection has been in charge of local police officials, and local financial officers issue cutting permits and conduct sales. The foresters (Oberförster) include provincial police officers, who are now required to have a 3-months' training in forestry, and some 30 professional foresters (out of a total of 105) who

have had a short training at various Austrian schools.—The first school of forestry was established in 1896 at Vytina and serves principally for training forest guards. A school forest of 16,000 hectares (chiefly *Abies cephalonica*) serves as a field for practical training. Two other similar schools are to be established, 1 in the Aleppo pine forest Chalandrion in Attica, the other in the hardwood forest Agyia, in the Mt. Olympus region.—For training the administrative personnel, the State sends a certain number of students each year to Austria. The law of 1917 provides for a higher forest school at Athens, to give a complete 4-year course. The curriculum is described. The number of students, fixed by the Minister of Agriculture, has so far been from 15 to 25 each year.—*W. N. Sparhawk.*

111. Slate, William L., Jr. **The first college course in field crops.** Jour. Amer. Soc. Agron. 13: 59–63. 1921.—Type, aims, content, and method of teaching the course are outlined. Its relation to the sciences, to specialized courses in crops, to farm experience and high school agriculture are shown. The author would place the course in the freshman year and allow 3–5 hours credit.—*F. M. Schertz.*

112. Stevenson, W. H., and P. E. Brown. **The teaching of soils in agricultural colleges.** Jour. Amer. Soc. Agron. 13: 63–70. 1921.—The authors advocate uniting all branches of soil instruction in one department. A 4-year agricultural course should include 4 or 5 courses in soils, such as: Soils, soil-fertility, manures and fertilizers, soil management and soil bacteriology. The laboratory work for these courses is also outlined.—*F. M. Schertz.*

113. Wagner. **Neuordnung des forstlichen Unterrichts fur Württemberg bezw. Südwestdeutschland. [Suggestions for reorganization of forestry instruction in southwest Germany.]** Allg. Forst.- u. Jagdzeitg. **1919**: 245–251. 1919.—Of the numerous forest schools that were established in Germany only 9 remained in 1900,—4 in North Germany and 5 in South Germany. Recently 2 more were abandoned, leaving only 7. Now Prof. Wagner, of the forestry faculty of the University of Tübingen, recommends a still further consolidation. The states of Württemberg, Hesse, and Baden, instead of having separate forest schools, which must necessarily be small in size and inadequately equipped, should bring together all their instruction in forestry in one well-equipped school, and Prof. Wagner suggests that it would be located at Heidelberg, with Tübingen as a second choice.—*Joseph S. Illick.*

114. Weatherby, C. A. **What the Latin names mean-II.** Amer. Fern Jour. **11**: 25–27. 1921.—The article completes the list of specific names started in the Amer. Fern Jour. **10**: 115–119. 1920.—*F. C. Anderson.*

115. Wentz, John B. **The standardization of courses in field crops.** Jour. Amer. Soc. Agron. 13: 52–59. 1921.—Colleges of the U. S. A. offer 133 differently named courses in field crops; these courses when classified as to ground numbered 47 and of these 47 only 20 are offered by more than one or two colleges. A table shows that great irregularity exists in the positions of the field crop courses in the college curricula. Another table shows that great variation is found in the number of hours devoted to the different courses by different colleges. Difference in importance of some crops in different parts of the country accounts for some of the variation.—*F. M. Schertz.*

116. Wolk, P. C. van der. **De Botanische Tuin in Lissabon. [The Botanical Garden in Lisbon.]** Aarde en haar Volkeren 57: 108–110. *Fig. 1–4.* 1921.

ECOLOGY AND PLANT GEOGRAPHY

H. C. Cowles, *Editor*

Geo. D. Fuller, *Assistant Editor*

(See in this issue Entries 79, 80, 127, 134, 141, 158, 196, 198, 199, 209, 345, 346, 347)

FOREST BOTANY AND FORESTRY

Raphael Zon, *Editor*
J. V. Hofmann, *Assistant Editor*

(See also in this issue Entries 30, 63, 83, 101, 110, 113, 306, 439, 452, 466)

117. Anonymous. **Annual administration report of the Afforestation Division [United Provinces, India] for the financial year 1919-20.** *28 p., 3 pl.* Government Press: Allahabad, 1920.—The report covers the work of the United Provinces Forest Service in reclamation of land ruined by erosion following denudation. It is estimated that there are 8,000,000 acres of denuded or eroded waste land in the Province, of which 23,768 acres are under government control, and 4,083 acres are being actively afforested. The report considers the constitution of state forests; summary of works carried out; exploitation of areas under reclamation; history of afforestation in the United Provinces; a copy of the agreement made with owners of ravine waste land; final report on famine relief operations; and financial statements. The afforestation projects are designed to furnish reserve supplies of fodder and fuel, and to stabilize and reclaim eroding areas. Of the many trees and grasses that have been experimented with, *Acacia arabica* and *Dalbergia sissoo* are the most satisfactory trees, though *Gmelina arborea*, *Tectona grandis*, *Holoptelea integrifolia*, and certain bamboos show great promise. The cost of reclaiming and afforesting is about 60 Rs. per acre. It has been found satisfactory to use reclamation projects to provide government relief for famine sufferers as all classes of labor can be employed, and the work can be closed at any time without being left incomplete.—*Winfield Dudgeon.*

118. Anonymous. **Ce que valent chênes et frênes sur pied. [Oak and ash stumpage prices.]** Bull. Trimest. Soc. Forest. Franche-Comté et Belfort 13: 277–278. 1920.—Oak stumpage prices are now approximately 30 per cent higher than a year ago in the Vosges and Haute-Saône. The present stumpage price of oak can be determined roughly by doubling the diameter of the tree (in cm.) and subtracting 10 francs; of ash by doubling the diameter and adding 10 francs. Prices for both species are still increasing.—*S. T. Dana.*

119. Anonymous. **Congrès de 1920. [Congress of 1920.]** Bull. Trimest. Soc. Forest. Franche-Comté et Belfort 13: 212–258. 1920.—The annual meeting of the forestry society of Franche-Comté and Belfort was held at Champagney, August 9–11, 1920. In addition to the usual banquet and general assembly, field excursions were made to a number of neighboring forests. Separate abstracts are given of the speeches made and of the descriptions of the forests visited.—*S. T. Dana.*

120. Anonymous. **Entwurf eines preussischen Gesetzes über Kahlschläge in Privatwaldungen. [Proposed Prussian law regulating clear cutting in private forests.]** Deutsch. Forstzeitg. 36: 39–41. 1921.—The proposed law forbids clear cutting of more than $\frac{1}{10}$ of the area of a forest unit, or excessive thinnings, without special permit. It applies to high forests, or similar forests, but not to coppice forests. All privately owned forests are subject to this law except those managed cooperatively, which are already provided for. This law is intended to prevent forest devastation, which is threatened, especially near the towns, until the proposed new law regarding forest culture can be passed and made effective. At present there is no legal way to prevent devastation of private forest lands in Prussia. Comments on the law, by Dr. Bertog, are appended.—*W. N. Sparhawk.*

121. Anonymous. **Errichtung von Forsteinrichtungsanstalten in Preussen. [Establishment of forest regulation office in Prussia.]** Forstwiss. Centralbl. 42: 267–270. 1920.—The organization of a new working-plans office in the Prussian state forest service is described which will put the work of regulating the cut in the hands of specialists, and will also save the treasury considerable money.—*W. N. Sparhawk.*

122. Anonymous. **Exportation des bois de feu et du charbon de bois. [Exportation of firewood and charcoal.]** Bull. Trimest. Soc. Forest. Franche-Comté et Belfort 13: 258–260. 1920.—At its annual meeting in August, 1920, the forestry society of Franche-Comté and Belfort adopted a resolution asking the government to remove the prohibition on exports of firewood and charcoal because in eastern France available supplies were considerably in excess of local needs. The assistant secretary of agriculture replied that while it was impossible to alter present restrictions immediately because of the great need in France for fuel of all sorts, he would attempt to find a market for firewood and charcoal from this region, and that where production remained in excess of consumption he was inclined to look favorably upon permitting such exports as might appear justified.—*S. T. Dana.*

123. Anonymous. **Studies in British forestry.** Nature 106: 646–647. 1920.—Review of bulletins 1, 2, and 3 of the Forestry Commission and comments on the work of the commission.—*O. A. Stevens.*

124. Anonymous. **Voeux votés par les conseils généraux de la Haute-Saône et du Jura tendant à l'augmentation de la production du bois d'oeuvre. [Increasing the production of timber.]** Bull. Trimest. Soc. Forest. Franche-Comté et Belfort 13: 283–288. 1920.—The general councils of the departments of the Haute Saône and the Jura have expressed their desire to support the efforts of the forest service; to secure the submission to the forest regime and the reforestation of waste areas belonging to the communes; to increase the proportion of conifers in the mountains; and to convert the stands of broadleaf coppice in the plains into high forest by increasing the number of young reserves. The conservators of waters and forests in these 2 departments have expressed their approval of this program to increase the production of timber, and have issued instructions accordingly to the forest force.—*S. T. Dana.*

125. Anonymous. [Rev. of: Boyd, J. **Afforestation.** *39 p.* W. R. Chambers, Ltd.: London, 1918.] Sci. Prog. [London] 14: 350. 1919.

126. Anonymous. **Conifers.** [Rev. of: Coltman-Rogers, Chas. **Conifers and their characteristics.** *xiii + 333 p.* John Murray: London, 1920.] Nature 106: 563. 1920.—Popular. Contains some errors, but is well printed and instructive. [See also Bot. Absts. 9, Entry 133.]—*O. A. Stevens.*

127. Anderlind. **Darstellung des Verhaltens der Holzarten zum Wasser. [Water relation of different forest trees.]** Allg. Forst- u. Jagdzeitg. 96: 29–40. 1920.—The concluding chapter of a consideration of the water relation of specific forest trees. The species considered are green Sitka spruce, green Douglas fir, Colorado blue spruce, and white spruce. These 4 species have been introduced extensively into Europe, but Douglas fir introduction surpasses all others. The experimental plots of this species comprise 365 acres in Prussia.—*Joseph S. Illick.*

128. Arndt. **Wie kann die heimische Holzproduktion ohne Vergrösserung der Waldfläche gehoben werden? [How to increase wood production without increasing forest area.]** Zeitschr. Forst- u. Jagdw. 52: 89–94. 1920.—Compulsory cooperation of small woodland owners is recommended as a means of increasing wood production without increasing the area of forest land.—*Joseph S. Illick.*

129. Beekman, H. A. J. M. **Economische gevolgtrekkingen voortr loeiende uit een analyse van den djati-opstand en van het djati-boschbedrijf op Java. [Economic conclusions derived from an analysis of djati growth and djati forest management in Java.]** *166 p., tables 1–4.* Wageningen, 1920.—A general account is given of the management of djati forests (*Tectona grandis*) in Java.—*J. C. Th. Uphof.*

130. Biehler. **Kann man die Kiefer natürlich verjüngen? [Can Scotch pine be regenerated naturally?]** Allg. Forst- u. Jagdzeitg. 96: 2–15. 1920.—The belief prevails among

foresters that Scotch pine cannot be regenerated successfully by natural reproduction methods. Clear-cutting followed by planting is the rule. The author, by citing numerous experiments and results therefrom, makes the claim that natural regeneration of Scotch pine is not only possible, but also practicable and to be recommended from an economic standpoint. The 2 principal factors upon which the successful natural regeneration of Scotch pine depends are soil condition and stand composition.—*Joseph S. Illick.*

131. Biolley, H. **Betrachtungen über die Forsteinrichtung in der Schweiz. [Observations on forest improvement in Switzerland.]** Schweiz. Zeitschr. Forstw. 72: 40–45. *2 pl.* 1921.—An answer to Dr. Flury in issues 9 and 10 of the "Jour. Forest. Suisse." The discussion is summed up under 4 heads: 1. "The relation of forest improvement and manage ment." These can not be separated since they are interdependent. The best management is accomplished by securing the best species, which can be done only through forest improvement. In order to favor any desirable species cuttings must be on a basis to secure young growth of that species, and in this both management and improvement are involved. 2. "The determination of the current increment." The current increment during decades or periods is not a sufficient basis for methods of management unless the records are continuous. The variation of growth during various periods makes the records of little value unless they are taken continuously. Increment based on volume and age is not considered sufficient to determine growth. 3. "Heyer's Formula." The formula has a far-reaching influence since it is accepted as a basis for finances, industry, and insurance. When all stands that have not passed middle age are omitted, ½ of the forest area is not considered in summing up the increment. The formula arrives at an average over long periods but does not give current increment. 4. "The concessions of Dr. Flury." Flury admits that the current increment is necessary in selection cutting, and Biolley inquires why the same principle is not applied to all forest stands whether the young stands are in mixture or in pure stands, and the cutting regulated accordingly.—*J. V. Hofmann.*

132. Boulger, G. S. [Rev. of: Church, A. H. (1) **Elementary notes on conifers.** Bot. Mem. [Oxford] 8. *32 p.* 1920; (2) **Form-factors in Coniferae.** Ibid. 9. *28 p.* 1920.] Jour. Botany 59: 81–82. 1921.

133. Boulger, G. S. [Rev. of: Coltman-Rogers, Charles. **Conifers and their characteristics, with illustrations.** *xiii + 333 p.* John Murray: London, 1920.] Jour. Botany 59: 27–29. 1921. [See also Bot. Absts. 9, Entry 126.]

134. Bourquet. **Les déboisements du Ballon d'Alsace. [Deforestation of the Ballon of Alsace.]** Bull. Trimest. Soc. Forest. Franche-Comté et Belfort 13: 225–237. 1920.—The upper basin of the Savoreuse River reaching a maximum elevation of 1,242 m. on the Ballon of Alsace contains 1,250 hectares, of which 1,150 are covered with a mixed high forest of broadleaf and conifer species. From 1916 to 1919 unusually heavy and intensive cuttings in these stands led to the deforestation of some 300 hectares and seriously disturbed normal forest conditions over large additional areas. These changes resulted during the winter of 1919–1920 in unprecedented floods in the Savoreuse River the total direct damages amounting to 164,000 francs as against a maximum of 4,500 in any previous year. At the request of the local residents the state is now taking steps to establish zones in which reforestation is obligatory, under the laws of April 4, 1882, and August 16, 1913, and also to purchase some 580 hectares in the 2 principal forests.—*S. T. Dana.*

135. Brunnhofer, A. von. **Verwaltungsrecht und Holzhandel—zwei Vorlesungen die an der Schweizer Techn. Hochschule gehalten werden sollten. [Administration and timber sales—two subjects that should be taught in Switzerland.]** Schweiz. Zeitschr. Forstw. 72: 65–74, 100–106. 1921.—With a minimum of 7 semesters in college and 1½ years practical experience required to pass the state examinations, the forester is not equipped to cope with the many phases of forestry and politics encountered on assuming the responsibility of a district of 4,000–13,000 hectares.—The public knows the forester only through political contact

and regards him as one who limits the activities of the people and dictates the forest policy as well as having police authority. These activities must be developed by experience and often work to the disadvantage of the inexperienced. The technical phases of forestry should also be emphasized, and the public should know that minor technical details often result in great savings to the community. With a thorough training in the handling of timber sales and the importance of technical administration, the forester is equipped to conduct the business of the forest, even in opposition of public sentiment because he knows the result will be for the common good.—In the second part special emphasis is placed on the importance of a knowledge of wood-using industries, logging, milling, and, above all, timber appraising. Uniformity in timber prices for all purposes and advertisement of prices is advocated.—*J. V. Hofmann.*

136. CARDOT, E. **La question sylvo-pastorale. [Forests and grazing.]** Rev. Eaux et Forêts 58: 323–329. 1920.—Individual trees, and still more groups of trees, are beneficial to grazing in mountainous regions because they break the force of the winds, moderate extremes of temperature, increase the relative humidity of the air and the formation of dew, decrease evaporation, and favor the propagation of the best forage plants. Trees are also necessary in such regions for the production of both timber and fuel. Difference of opinion exists as to whether trees, either singly or in groups, are more beneficial when scattered through the grazing areas or when segregated into distinct stands confined to the more exposed and least favorable sites and not open to grazing. The author adheres strongly to the latter view, and believes that the use of forests for grazing is detrimental to the best development of both trees and forage. France has so far paid too little attention to this very important problem, often with disastrous results.—*S. T. Dana.*

137. [CHRISTY, MILLER.] **"Wistman's Wood."** Jour. Botany 59: 74–75. 1921.—This is a reprint of an article by Christy in Proc. Linn. Soc. It is an account of an ancient grove of gnarled trees of *Quercus pedunculata*, in Dartmoor. Many accounts of this wood have been written. Perhaps the earliest was that of TRISTRAM RISDON just 3 centuries ago.—*K. M. Wiegand.*

138. CLERC, JEAN. **Forêt communale de Champagney. [Communal forest of Champagney.]** Bull. Trimest. Soc. Forest. Franche-Comté et Belfort 13: 212–215. 1920.—The communal forest of Champagney has been managed consistently since 1824 as coppice under standards with a rotation of 28 years. That part of it known as Terre aux Saints is about 70 per cent oak and 30 per cent beech and other species. It was heavily overcut during the war but still has some fine reserves.—*S. T. Dana.*

139. COLLEY, REGINALD H. **The effect of incipient decay on the mechanical properties of airplane timber.** [Abstract.] Phytopathology 11: 45. 1921.—Tests of sound and decaying wood of Sitka spruce (*Picea sitchensis* Carr.) and Douglas fir (*Pseudotsuga mucronata* Sudw.) showed that incipient decay produced by *Fomes pinicola*, *F. laricis*, and *Polyporus Schweinitzii* weakened the timbers very markedly, while pieces infected with *Trametes pini* were as strong or stronger than sound wood.—*B. B. Higgins.*

140. COVENTRY, B. O. **Progress report of forest administration in the Jammu and Kashmir State for 1917-1918.** *77 p.* Lahore, 1920.—The usual annual report is presented. At the close of the year the total of all classes of forests was 9,495 square miles of which 8,859 were demarcated. It is stated that natural regeneration in the coniferous forests is only fairly satisfactory but varies considerably in different localities. In the Chir pine forests natural regeneration is usually very prolific provided the forests are protected from fire. Natural regeneration of deodar is good in the Lolab forest but not so satisfactory in the forests of the Kishenganga valley. On bare hill sides natural regeneration of blue pine is very conspicuous. In the broad-leaved forests natural regeneration from coppice shoots is usually satisfactory provided the areas after being felled are protected against cattle. Formal statistical statements for the year are appended.—*E. R. Hodson.*

141. CUBITT, G. E. S. **Wood in the Federated Malay States.** *31 p., 4 maps.* Government Press: Kuala Lumpur, 1920.—The forests, their distribution, and, in the view of the author, the great necessity of their conservation are discussed.—*I. H. Burkill.*

142. DEMORLAINE. **Forêt communale de Plancher-les-Mines. [Communal forest of Plancher-les-Mines.]** Bull. Trimest. Soc. Forest. Franche-Comté et Belfort 13: 253–255. 1920.—This forest, 37 per cent fir, 17 per cent spruce, 34 per cent beech, and 12 per cent other species, was managed until 1913 as a regular high forest with a rotation of 144 years. In 1913 steps were taken to convert it into a selection forest with the same rotation divided into 12 cycles of 12 years each. The annual yield is estimated at about 5 cubic meters per hectare. Previous cuttings of beech have been too heavy, and an effort should be made to maintain approximately the present proportion of this species.—*S T. Dana.*

143. DEMORLAINE. **Forêt domaniale de Saint-Antoine. [State forest of Saint-Antoine.]** Bull. Trimest. Soc. Forest. Franche-Comté et Belfort 13: 255–258. 1920.—This, like most State forests, is at a higher elevation and further from the center of population than the adjacent communal forest. Composed of a mixed stand of broadleaf species and conifers, it is divided into 7 series with a rotation of 128 years. Five of these are treated as regular high forest, 1 as a protection forest, and 1 as an aesthetic forest. Silver fir reaches its optimum development here at an altitude of 600–1,200 m. and 1 specimen has a circumference of 4.4 m., a height of 45 m. and a volume of 30 cubic m. Rather heavy cuttings were made during the war, but these were handled so skillfully that the forest is in excellent condition.—*S. T. Dana.*

144. DIEDRICHS, A., UND L. KNÖRR. **Babassonüsse und deren Öl. [Babasso nuts and their oil.]** Zeitschr. Untersuch. Nahrungs- u. Genussmittel 40: 152–153. 1920.

145. DIEDRICHS, A., UND L. KNÖRR. **Das Samenöl des Condoribaumes (Adenanthera pavonina L.). [Seed oil of Adenanthera pavonina.]** Zeitschr. Untersuch. Nahrungs- u. Genussmittel 40: 153–155. 1920.

146. DIHM. **Ein Nachteil der Fichtenlohrindengewinnung. [A disadvantage of spruce tanbark exploitation.]** Forstwiss. Centralbl. 42: 399–401. 1920.—The shortage of tanning materials in Germany during and subsequent to the war was partly met by the use of spruce bark. Trees cut during the winter must lie in the woods until May to be peeled, but this results in very serious attacks by borers, which greatly reduce the value of the wood. It will be necessary either to give up peeling winter-felled trees, or to find means to peel them earlier so that the wood will become dry before the first beetle broods emerge in March.—*W. N. Sparhawk.*

147. EBERTS. **Ergebnis der Harznutzung in einigen Staatsforsten des Regierungsbezirks Cassel im Jahr 1918. [Turpentining in state forests of Cassel in 1918.]** Allg. Forst- u. Jagdzeitg. 95: 208–212. 1919.—The result of harvesting turpentine from Scotch pine and Norway spruce is presented. The expenditures and receipts are itemized. Scotch pine stands ranging in age from 60 to 105 years produced a net yield from turpentine of 210 marks per acre, and a net profit of 1.75 marks per kg., while Norway spruce produced a net yield of only 1.40 marks per acre and 0.12 marks per kg. The net return from collecting "wild" turpentine from Norway spruce, that is, from trees barked by deer and other animals, was 0.49 mark per kg. The study showed that frequent scraping of the bleeding surface increases the total yield. The surface should be scraped and scarred at least 5 times every 2 weeks, oftener if possible.—*Joseph S. Illick.*

148. ECKSTEIN, KARL. **Beiträge zur Kenntnis des Hausbocks, Hylotrupes bajulus L. [Identification of wood-destroying house beetle.]** Zeitschr. Forst- u. Jagdw. 52: 65–89. 1920.—A description of the life history, food habits, and damage of the wood-destroying beetle, *Hylotrupes bajulus* L. It attacks only coniferous wood and is common in building material. The larvae, which live from 3 to 11 years, perforate the wood with numerous channels and sometimes destroy it completely.—*Joseph S. Illick.*

149. Erdmann, F. **Gedanken über Waldwertrechnung. [Forest valuation.]** Zeitschr. Forst- u. Jagdw. 52: 146–166. 1920.—A critical discussion of soil value, growing stock value, sale value, expectation value, cost value, and other important subjects of forest valuation. A complete classified list of kinds of value used in forestry is given.—*Joseph S. Illick.*

150. Escherich, K. **Die Generationen des grossen braunen Rüsselkäfers (Hylobius abietis). [Generations of the large brown weevil.]** Forstwiss. Centralbl. 42: 425–431. 1920.—Investigators in different regions have disagreed as to the length of generation of the weevil, some finding a period of 15 months from egg to imago (2-year generation), others 12 months (1-year generation), and others 3–5 months (2 generations per year). All 3 positions are supported by reliable data. The difference appears to be due to climatic variations.—It is suggested that in regulated forests where the cutting is more or less concentrated in space and season the emergence of the beetles is likewise concentrated and more likely to prove harmful than where, as in a virgin stand, the beetles come out at various times through the year.—*W. N. Sparhawk.*

151. Falck. **Wege zur Kultur der Morchel-Arten. [Methods of cultivating Morels.]** Zeitschr. Forst- u. Jagdw. 52: 312–323. 1920.—A plan to raise edible fungi by natural methods within the forest as a companion crop to the wood.—*Joseph S. Illick.*

152. Fankhauser, F. von. **Aufforstung und Verbauung im Hochgebirge. [Afforestation and terracing in the high mountains.]** Schweiz. Zeitschr. Forstw. 72: 11–20. 1921.—The author takes exception to Marti's contention that the high-mountain meadows should be afforested. He states that some of the areas are above the commercial timber line and that the stocking of those areas with trees would cause an endless controversy with the grazing industry. If the mountain lakes were drained and the meadows stocked with forests the construction of numerous terraces and dams would be necessary. The cost of such construction would be prohibitive and the upkeep high. The grass lands afford sufficient protection for ordinary rainfall and the excessive rainfall is rare as are also the cloudbursts or extraordinary showers in the mountains. Consequently the protection afforded at present is as good as can be provided. The construction of terraces or dams would not provide for the exceptional and excessive rainfall, and the resultant damage and danger would be greater.—*J. V. Hofmann.*

153. Finckenstein, Finck von. **Künstliche Düngung im Walde. [Artificial fertilizing in forests.]** Zeitschr. Forst- u. Jagdw. 52: 342–345. 1920.—An experiment was started in 1913 in a 60-year old Scotch pine stand developed in an abandoned field. The area was classed as site-quality IV or V for Scotch pine. The object of the experiment was to determine the effect of artificial fertilizer. Some of the demarcated plots were treated with quicklime at the rate of 1780 lbs. per acre; others with carbonate of lime at the rate of 3660 lbs. per acre. At the end of 6 years the limed plots showed a cross-sectional growth of the stems about 6 per cent above that of the plots not limed. There was also a perceptible difference in the forest floor cover vegetation on the treated and untreated plots.—*Joseph S. Illick.*

154. Flury, Philipp. **Die Fortbildung des sächsischen Forsteinrichtungsverfahren. [The development of the methods of the forest institution of Saxony.]** Naturwiss. Zeitschr. Forst- u. Landw. 18: 249–261. 1920.—A brief, critical review of a few of the more important topics discussed in a recent publication (Tharander Forst. Jahrb. 71: 30–57, 72–89. 1920) under the above title by Dr. Martin. The author criticizes the Saxon method of regulating the yield by the use of inflexible yield tables rather than by careful measurements of the timber resources, and contends that forest management must be more or less elastic and not entirely scholastic. It must accommodate itself to all cultural changes, must protect the forest from over-utilization through calculations of the forest resources (capital) and yields based on safe and established principles, and must abandon the idea, rather firmly established in Saxony, that the "calipers" are an unnecessary implement.—*J. Roeser.*

155. Greve. **Vorschläge zur Geschäftsanweisung für preussische Staatsoberförster. [Duties of Prussian State Oberförsters.]** Zeitschr. Forst- u. Jagdw. 52: 129–140. 1920.—A comparative discussion of the duties of Prussian Oberförsters as set forth in the regulations of 1870 and what should now be regarded as their complete line of work.—*Joseph S. Illick.*

156. Gurtu, S. K. **Forests and irrigation: A plea for scientific preservation and growth of state forests and special cultures.** Agric. Jour. India 16: 32–39. 1921.

157. Guyot, Ch. **Pour la personnalité civile de l'École Nationale des Eaux et Forêts. [Making the National School of Waters and Forests a civil body.]** Rev. Eaux et Forêts 58: 351–352. 1920.—The law of August 5, 1920, made the agricultural colleges of the country civil bodies ("persons"), and provided that in all their acts as such they should be represented by a director and administered by a council. These provisions should be extended to the National School of Waters and Forests, which is now nearly 100 years old and which could make good use of the rights and privileges accorded by such a status.—*S. T. Dana.*

158. Hauber. **Der Rückgang der Vegetationsgrenzen in den Alpen und ihre Bedeutung für die Almwirtschaft. [The retreat of the vegetation limit in the Alps and its significance for the dairy industry.]** Forstwiss. Centralbl. 42: 436–443. 1920.—The retrogression of the upper limits of vegetation in the eastern Alps, and the decline or disappearance in many places of the dairy industry which formerly depended upon the high-mountain pastures, is due partly, perhaps, to climatic changes, but more to the acts of man. The cutting of alpine forests for timber, and the burning of brush-covered areas to improve pasturage, exposed the alpine meadows to the winds, with the result that grass and practically all other plant growth gradually disappeared. Overgrazing by cattle and, later, more serious overstocking with sheep, prevented reproduction of the trees, necessary to shelter the meadows, and also injured the forage cover, so that many areas which once supported abundant stock have become barren wastes. These conditions can be remedied only by establishing protective belts of brush and trees,—a long and costly task.—*W. N. Sparhawk.*

159. Heck. **Kahlschlagwirtschaft am Hochgebirge. [Clearcutting methods on mountains.]** Allg. Forst- u. Jagdzeitg. 95: 260–263. 1919.—A critical discussion of the possibilities of natural regeneration on mountain slopes. The advantages and disadvantages are discussed. Several experimental cuttings are cited.—*Joseph S. Illick.*

160. Helbig, Maximilian. **Zusammengefasste Ergebnisse der Karlsruher Stickstoffdüngungsversuche mit Fichten, ihre Bewertung und Stellung zu fremden Versuchsergebnissen. [Results of nitrogen fertilizer experiments with spruce.]** Forstwiss. Centralbl. 42: 262–267. 1920.—The results of experiments in fertilizing spruce nursery stock, 1907–1917, are summarized. Full fertilization (potash, basic slag, and nitrates) applied to 2-year transplants produced greater height growth than partial fertilization (nitrates only) or no fertilization; and the effect persisted, although to a lesser degree, with another application of the fertilizers when the trees were transplanted at 4 years of age. On the other hand, fertilized transplants, set out in the open without fertilizer when 4 years old, grew more slowly than those not fertilized in the nursery bed, and at the end of the 8th year had lost their early gains and were shorter than the partially or unfertilized ones. Relative weight of root-system was less in the completely fertilized plants, but needle weights were about the same. The foliage of fertilized plants was of a deeper green color but apparently no healthier than that of the others. Transplanting reduced the height growth of both fertilized and unfertilized plants. The conclusion is reached that fertilization of young spruce with nitrates alone is not profitable, but that complete fertilization is advantageous in cases where tall planting stock is desired at an early age.—The author's results do not entirely agree with those of Möller and Albert.—*W. N. Sparhawk.*

161. Hielscher. **Zur natürlichen Verjüngung. [Concerning natural regeneration.]** Deutsch. Forstzeitg. 36: 2–3. 1921.—Arguments for and against the use of natural reproduc-

tion are discussed with particular reference to a spruce forest in the Culm district (west Prussia).—*W. N. Sparhawk.*

162. HILF. **Die Holzversorgung der Türkei und ihr Einfluss auf die Kriegsführung. [Wood supply of Turkey and its influence on the world war.]** Zeitschr. Forst- u. Jagdw. **52**: 346–360. 1920.—A record of observations on the forest conditions of Turkey taken on the expedition of General von Falkenhayn to Palestine in 1917–18. The conclusion is reached that the failure of the expedition is to be attributed entirely to the lack of an adequate wood supply. Railroad engines had to be fired with wood. A 6-hour run required that the tender be reloaded 3 times, each tender load costing 3,000 marks. When green wood was used it was impossible to keep up enough steam to cross steep grades. The entire region covered by the expedition was poorly forested. Lemon, orange, and olive groves dotted moist and warm places, and here and there near Jewish settlements Eucalyptus plantations occurred, which were established in the belief that the trees would keep away mosquitoes. The author suggests that Turkey and adjoining countries offer a fertile field for future forestry work.—*Joseph S. Illick.*

163. HOLLAND. **Aus der Praxis der Forsteinrichtung in Württemberg. [Forest organization in Württemberg.]** Tharander Forst. Jahrb. **72**: 14–44. 1920.—A critical discussion of some of the principles of forest organization used in forest practices of Württemberg. Rotation, final and intermediate cuttings, felling budgets, compartments and subcompartments, yield, and reserve fund are among the subjects discussed. The first decade (1917–1926) of working plans for 1913–1936 are considered.—*Joseph S. Illick.*

164. HOLTEN, JUST. **Alter und Zuwachs-Untersuchungen alter Eichen in lolländischen Wäldern. [Age and increment studies of old oaks in the forests of the island of Lolland.]** Naturwiss. Zeitschr. Forst- u. Landw. **18**: 261–270. *1 fig.* 1920.—A few of the giant oaks, which occur in scattered stands on the island, are described, the largest having a circumference of 900 cm. The particular type is confined to low, moist, stiff clay soils; the external features are not inherited, but are the result of favorable location and physical conditions. From a number of measurements, the author secured a diameter-increment curve from which he constructed 2 tables showing increment and age for various diameters. He also determined the basal areal increment and from it derived the rule that the basal areal increment remains constant above a diameter of approximately 100 cm., above which diameter-height growth ceases, and the size of the crown (total leaf area) remains constant. The greatest age determined (from a tree that fell in 1915) was 1059 years.—*J. Roeser.*

165. HUFFEL, G. **Emploi de tracteurs à chenilles dans les exploitations forestières. [Use of caterpillar tractors in forest exploitations.]** Rev. Eaux et Forêts **59**: 40–42. 1921.—Experiments in the forest of Haguenau (Bas-Rhin) showed that a small, 35-horsepower caterpillar tractor weighing 660 pounds can easily climb slopes of 35–40 per cent and cross swamps, ditches, and small streams. It maneuvers readily in pole stands and does little or no damage to the soil, but is destructive to seedlings in areas under regeneration. The tractor is able to haul easily 3 pine logs with a total volume of more than 140 cubic feet, but is not recommended for extracting stumps. It fells 120-year Scotch pine at the rate of 350 cubic feet of timber and 1.5–2 cords of stump wood per hour, but is not satisfactory for felling hardwoods. It is not of interest in regions where logging is easy and not expensive, but can be used to advantage for removing logs in mountainous country without good roads or in other regions difficult of access or where team transportation is costly. Its usefulness in felling coniferous trees is limited to cases where it is desired to extract the stumps, as is usually the case, and then only when the labor of woodcutters is particularly expensive.—*S. T. Dana.*

166. HUNZIKER, W. **Entgipfelung judger Wiesstannen durch die Waldwühlmus (Hypodeus glareolus Wagn.) [Topping of young white fir by the forest mouse (Hypodeus glareolus Wagn.).]** Schweiz. Zeitschr. Forstw. **72**: 97–100. *1 pl.* 1921.—Damage by cutting of terminal buds had been noted in various localities for several years and had been attributed to squirrels, jays, cross-bills, or deer. The typical damage (near Argau) of clean-cut tips and branches

of young growth at 0.5–6 m. above ground cast suspicion on the mouse, known to be a good climber.—Burrows and trails were common under the injured trees, but few cut tips could be found. Direct observations and trapping in the trees demonstrated the above named mouse to be the cause of the damage.—*J. V. Hofmann.*

167. JACOB, W. R. LE G. **Report on forest administration in the Andamans for 1918-19.** *45 p.* Calcutta, 1920.—The usual annual report with summarized statistical data. There is included a condensed statement covering the preceding 5-year period. In the South Division the surplus at the close of the year was 552,598 Rs., or 56.8 per cent of the revenues. This amount is offset by a deficit of 169,677 Rs. in the North Division, as the latter was organized during the year and timber extraction was not begun. A survey on 2-inch scale of the remainder of the forests of the North and Middle Andamans is required immediately, as timber utilization is about to begin. Considerable damage was done to rubber trees and seedlings in nurseries by heavy winds in June, 1918. Development of the forests, especially those of the North Andaman, necessitates a great increase in the staff, as regeneration of areas following clear cutting will require a large amount of trained supervision.—*E. R. Hodson.*

168. JUCHT. **Naturverjüngung im Dürrnbucherforst.** [**Natural reproduction.**] Forstwiss. Centralbl. **42**: 402–404. 1920.—This pine and spruce forest (in Bavaria) had been managed on a system of clear cutting followed by artificial seeding; results were not satisfactory. In 1911 natural regeneration was decided on and secured by using a modification of WAGNER's border-cutting method, and preparing the soil in advance of the preparatory cutting by removing most of the living soil cover as well as some of the dead litter in case much of the latter was present.—*W. N. Sparhawk.*

169. JUNACK. **Weder Bodenreinertragswirtschaft noch Waldreinertragswirtschaft.** [**Soil rent and forest rent.**] Zeitschr. Forst- u. Jagdw. **52**: 166–168. 1920.—A review of the forest-rent and soil-rent controversy.—*Joseph S. Illick.*

170. KATZER. **Grundlinien einer neuen Forst-Wirtschaftsphilosophie.** [**A new forestry point of view.**] Allg. Forst- u. Jagdzeitg. **96**: 16–17. 1920.—The author discusses some of the fundamental principles of forestry and presents a rational scheme of coordinating all branches of forestry.—*Joseph S. Illick.*

171. KENT, H. T. M. **Report on the results of mechanical tests carried out on some Malayan timbers.** *9 p.* Government Press: Kuala Lumpur, 1920.—Dry weight, elastic limit, modulus of elasticity, and modulus of rupture of the timbers of 55 species of Malayan trees.—*I. H. Burkill.*

172. KINDLE, E. M. **Mackenzie River driftwood.** Geog. Rev. **11**: 50–53. 1921.—Driftwood is a familiar feature on the shores of arctic America. Dr. FREDRIK INGVARSON (Die Triebhölzer auf dem Ellesmere-Land, Rept. of the second Norwegian Arctic Expedition in the Fram, 1898–1902, Vol. 3, No. 24, p. 1–57, Christiania, 1911) recognizes 3 main sources of driftwood: (1) the Yenisei and Lena rivers of Siberia, (2) the St. Lawrence, and (3) the coast of Norway. He does not mention the Mackenzie river, which Kindle considers second only to the Siberian rivers as a source of arctic coast driftwood. The Mackenzie river, although a great carrier of driftwood, is not itself a great producer. The supply comes mainly from its western tributaries, of which the Gravel and the Peele contribute large quantities; but the great bulk comes from the Liard river. In 1919 the vanguard of the main volume of the Liard driftwood reached Old Fort Good Hope on the lower Mackenzie about July 13. The writer reports that the immense volume of this floating mass of forest debris greatly exceeded anything previously seen or imagined. In general it formed a nearly continuous mass ½ mile or more in width and in this closely packed condition occupied about 4 days in passing a given point. Spruce and poplar comprise the great bulk of the Mackenzie driftwood. "Here indeed is a mammoth supply of pulpwood delivered at tidewater, cutting and transportation free, that merits the consideration of any enterprising paper company which can

solve the commercial problem of transportation around the Alaskan coast." This vast contribution of driftwood eventually comes to rest chiefly on the coast of arctic America and the islands west of Greenland. A recent explorer reports finding fuelwood abundant 200–300 miles on either side of the Mackenzie River delta.—*E. R. Hodson.*

173. Kreutzer, E. **Reinertragslehre und Hönlingertheorie. [The theory of net rentals and Hönlinger's theory (for forest valuation).]** Oesterreich. Forst.- u. Jagd. Zeitg. 38: 35–36. 1920.—The 2 theories are discussed and it is shown how Hönlinger attempts by mere juggling of equations to prove the correctness of his method. The author concludes that both theories are incorrect; the 1st because it does not allow for all the elements which go to make up the forest capital, and confuses costs of management and costs of maintenance in its formula; the 2nd because it is based on a false formula for soil value, due to the conception that the net yield represents rental on the soil capital only rather than on the whole forest capital.—*W. N. Sparhawk.*

174. Kunkele. **Die Umwandlung der reinen Kiefernbestände im Pfälzerwald. [Conversion of pure pine stands.]** Forstwiss. Centralbl. 42: 281–292. 1920.—The forests of the Palatinate cover about 150,000 hectares. In the 16th century they were composed mainly of oak and beech, with small amounts of pine, fir, and other broad-leaved species; now pine occupies more than half the area. The pine is shorter than in other parts of Germany and does not grow in such dense stands; therefore, it is desirable, in order to maintain good soil conditions and to increase the yield of wood per hectare, to mix other tolerant species with the pine. The present time is particularly favorable for making this change, because the abnormal demand for timbers and fuel wood allows extensive silvicultural operations in the stands of pole size. Methods for accomplishing the desired result in various sorts of pole stands, as well as in mature stands, are described.—*W. N. Sparhawk.*

175. Langdon, Ladema M. **Identification of mahoganies.** [Rev. of: Dixon, H. H. **Mahogany, the recognition of some of the different kinds by their microscopic characteristics.** Notes Bot. School Trinity Coll. Dublin 3: 3–58. *23 pl.* 1919 (see Bot. Absts. 3, Entry 2017).] Bot. Gaz. 69: 189–190. 1920.

176. Leete, F. A. **Report on forest administration in Burma for year ended June 30, 1919.** 315 p. Rangoon, 1920.—An annual report with statistical data, including also a review of the preceding quinquennium. The past 5 years have witnessed a growing interest in silvicultural problems. Whereas, previously, the mixed and uneven-aged character of the forests was held to make it impossible to break away from the diffused method of working known as the "selection system," it is today generally recognized that there are immense practical possibilities in artificial regeneration, and that it need no longer be confined to small areas in a few specially favorable localities. The size of the areas clear-cut in any one place need simply to be limited by the amount of ground that can by covered with young forest growth by artificial means. This makes possible profitable use of mechanical methods of extraction of timber to a far greater extent than could have been hoped for with the old diffused method of working,—a great step forward in the development of Burma's forests. "Utilization" also is undergoing great expansion. The industrial activity in India, caused by the war, has attracted the attention of many to the commercial potentialities of Burma's forest products. The paper pulp industry is at last progressing, many tanning materials are under investigation, and wood distillation is receiving attention. Some results have been obtained in box-making, indicating successful use of plywood for the purpose. Plans are being drawn up for the organization of a Forest Research Institute for the province. A modern drying kiln has been ordered from America to aid in the solution of the numerous problems connected with seasoning. The all-important problem of the mechanical extraction of timber from the forests has recently been studied in America, where such extraction is most highly developed, by the Chief Conservator, and an American forest engineer has just arrived in Burma to assist in advising on extraction methods. Two new Conservatorships,—one for research and one for utilization,—have just been created. At the close of the year the total area of reserved

forests was 29,336 square miles, and of unclassed forests 116,829 square miles. To some extent the expansion of forest revenue will depend on the amount of revenue which the government is able to put back into the forests. But, although the percentage of surplus to gross revenue is higher in Burma than in any province in India, forest revenue cannot be devoted exclusively to expenditures on forest development since it must be prorated in accordance with the needs of all lines of the government's work. The area under approved working plans is 10,855 square miles, and 18,425 square miles are unprovided for. In the future such plans will be based on the new system of concentrated exploitation and regeneration as shown by the revised Tharrawaddy working plan. In India, extraction roads tapping previously inaccessible forests, even when constructed at high cost, have proved exceedingly profitable. During the last few years the advanced cost of elephants has made it impossible to use the animals for the extraction of timber, except teak and possibly pyinkado (*Xylia dolabriformis*). The future regeneration of the bamboo forests of Burma must be by artificial methods as natural regeneration is too uncertain and requires the retention of seed bearers. "It may be taken as an axiom that no natural product can permanently withstand a heavy artificial demand without artificial assistance to aid it in reproduction and development."—*E. R. Hodson.*

177. Ludwig. **Ein Forstdüngungsversuch in einer verheideten Fichtenpflanzung. [An experiment in forest fertilizing in a heath plantation of Norway spruce.]** Zeitschr. Forst- u. Jagdw. 52: 42–51. 1920.—An experiment established in 1914 in a 15-year-old stand of Norway spruce to determine the effect of mowing the heath plants, grubbing the surface soil, application of commercial fertilizer, inter-cropping of white alder, perennial lupine, and *Spartium scoparium*, and soil coverings with branches and broom. The experimental plot (390 × 520 feet) was located within a 30-acre plantation set out in 1903 using 4-year-old transplants spaced 4 × 4 feet. The entire plot was sub-divided into 48 quadrants (65 × 65 feet). The preliminary results show that the application of fertilizer alone neither stimulates growth nor suppresses the heath. An acceleration of growth was noted only where the physical condition of the soil was improved simultaneously with the application of the fertilizer.—*Joseph S. Illick.*

178. Marc. **La forêt domaniale d'Abrechwiller au cours du XIXe siècle. [The national forest of Abrechwiller during the nineteenth century.]** Rev. Eaux et Forêts 58: 317–322, 345–350. 1920.—The forest of Abrechwiller, comprising some 3,570 hectares of nearly pure silver fir in the Basses-Vosges, was ceded to the state by the princes of Linanges in 1801 by the treaty of Lunéville. Heavily encumbered by rights of user, comparatively inaccessible, and almost without roads or other means of transportation aside from drivable streams, its management was unusually difficult. The first real working plan for the forest was prepared in 1858. Under this, rights of user were practically canceled, the reforestation of openings was secured rapidly by artificial seeding of Scotch pine and natural seeding of silver fir, and the entire stand was treated as high forest with a rotation of 120 years.—The Germans, after the annexation of Alsace-Lorraine in 1870, followed the same plan, and in addition pushed vigorously the construction of roads and trails and even of a logging railroad. In 1815, however, they made modifications which display certain features characteristic of German forest management throughout Alsace-Lorraine. These include (1) a unit of management that is administrative rather than economic, with nothing comparable to the French series; (2) a very flexible management which aims to treat each stand in accordance with its particular needs, but which tends to split the forest into an infinite number of parcels and subparcels; and (3) the absence of fixed rules of exploitation and the giving of a comparatively free rein to local forest officers.—During the past 20 years faulty reproduction cuttings and the superabundance of deer, which are very destructive of fir seedlings, have resulted in an almost complete lack of natural regeneration. To remedy this situation large areas of Norway spruce have been planted in spite of the fact that spruce is not well adapted to the site. Furthermore, complicated and confused methods, unaccompanied by any clear-cut plan of management, have led to the creation of such an infinite number of small heterogeneous parcels that the present forest resembles a "harlequin's cloak." In short, while the forest has undoubtedly increased in value during the 19th century, it has been reduced to a state of profound disorder from which it must now be rescued by the skill of the French foresters.—*S. T. Dana.*

179. MARTIN. **Das Streben nach Gleichheit und Ungleichheit in der Forstwirtschaft. [Striving for and against uniformity in forestry.]** Tharander Forst. Jahrb. 72: 45–61. 1920.—A comparative discussion of the methods of regeneration, both artificial and natural, used in Germany. The basic principles and objectives of many standard methods are given, and the actual results attained by each method are cited. Large unit management and small unit management, and even-aged and uneven-aged stands are compared. Some foresters favor uniformity within stands and differences between stands, while others prefer a mixed condition within stands. The author believes that there is good in both principles, that unnecessary variety should be avoided, and that undue effort should not be put forth to attain uniformity in stands.—*Joseph S. Illick.*

180. MARTIN. **Das Verhalten von Kiefern-Buchen-Mischbeständen in ökonomischer Hinsicht, mit besonderer Rücksicht auf die forstlichen Verhältnisse Sachsens. [Mixed stands of Scotch pine and beech in Saxony.]** Tharander Forst. Jahrb. 71: 269–282, 299–318. 1920.—Beech was originally common in the forests of Saxony. Through the use of clear-cutting methods and specializing in Norway spruce production, most of the beech has been eliminated. Recent studies show conclusively that it is desirable to bring back the beech. Mixed stands of Scotch pine and beech have advantages over pure stands of Norway spruce. They satisfy more fully the desire of forest owners, are less subject to damage by destructive agents, and keep the soil in a better productive condition.—*Joseph S. Illick.*

181. MARTIN. **Die Bedeutung J. H. von Thuens für die Forstwirtschaft. [Forestry work of J. H. von Thuens.]** Allg. Forst- u. Jagdzeitg. 95: 99–106, 131–137, 157–172. 1919.—A critical review of the most important research works of J. H. von Thuens, who was not a professional forester but who developed many original ideas along forestry lines and collected an enormous amount of valuable information, based chiefly upon forest experiments. Among the topics considered are land classification, wages, rate of interest, the relation of increment and growing space, and forest and stand yield. Results of sowing and planting Norway spruce are discussed and supported by several tables. The effect of different grades of thinning on Scotch pine is also discussed, and the yield of beech and oak in different site-qualities is given. A critical review of the subject of rotation and its influence upon yield is considered. The basic factors and conclusions on many important economic forest problems are reviewed in detail.—*Joseph S. Illick.*

182. MARTIN. **Forêt domaniale de Cherimont. [State forest of Cherimont.]** Bull. Trimest. Soc. Forest. Franche-Comté et Belfort 13: 250–253. 1920.—This forest, 50 per cent beech, 20 per cent oak, 15 per cent hornbeam, and 15 per cent other species, was formerly managed as coppice under standards with a rotation of 30 years. In 1860 its conversion into high forest was decided on and a working plan prepared. The new rotation was set at 120 years with 4 periods of 30 years each and preceded by a transition period of the same length. Some underplanting of silver fir is now being done with a view to increasing the proportion of conifers.—*S. T. Dana.*

183. MARTIN. **Ist die Herabsetzung der Umtriebzeit und die Verminderung des Holzvorrats in den sächsischen Staatsforsten zulässig? [Is the lowering of the rotation and the corresponding reduction of growing stock in the state forests of Saxony admissible?]** Tharander Forst. Jahrb. 71: 287–297. 1920.—The percentage of forest stands over 100 years old in Germany is 15.4, in Prussia 15.4, in Bavaria 21.0, in Württemberg 11.7, and in Saxony 3.6. The present rotation in Saxony is only 85–90 years; in other states it is higher. To lower the rotation still further is not to be recommended for economic and silvicultural reasons. If the cut must be increased it may be done by making heavier thinnings and by clear-cutting undesirable stands.—*Joseph S. Illick.*

184. MEISSNER. **Versuche zur Hebung von Föhren und Fichtenkrüppelkulturen. [Attempts to improve stunted pine and spruce plantations.]** Forstwiss. Centralbl. 42: 315–329. 1920.—The arrested development of pine and spruce stands, common in certain parts of the

Upper Palatinate, is attributed to plant and animal enemies, principally the heather,—which temporarily suppresses the young trees,—blight, and various leaf-rollers. Various methods of improving soil conditions have been tried in order to keep down the heather and enable the trees to resist the other enemies. The best results were obtained by grubbing out the heather, or by sowing broom, larch, or possibly *Pinus strobus* among the young trees. No benefit resulted from loosening the soil by blasting, from application of various fertilizers, from intersowing of lupine, pitch pine, or jack pine, or from modifying the silvicultural system so as to give the advance reproduction a start over the heather.—*W. N. Sparhawk.*

185. MOLDENHAWER, K. **Enskinnet Jernbane. [Monorail.]** Dansk Skovforenings Tidsskr. 6: 19–25. *Fig. 3.* 1921.—Review of article in Dutch by Professor TE WECHEL. A description of a monorail for transporting logs from the woods. It consists of 1 ordinary rail laid on posts set in the ground; a wheel running on this rail carries a balanced carrier of logs on each side of the rail line. This method is in general use in Java. Its advantages are that it is cheaply constructed, does not require wide clearings or bridges, the grade is obtained by having posts longer or shorter according to the lay of the ground, and logs are readily carried over rough ground and across creeks, roads, and natural depressions. The speed of the loads can be controlled by a brake.—*J. A. Larsen.*

186. MÖLLER. **Kiefer-Dauerwaldwirtschaft. [A continuous method of handling Scotch pine.]** Zeitschr. Forst- u. Jagdw. 52: 4–41. 1920.—Twenty-nine years of experimenting (1884–1913) on the forest of Barenthor near Dobritz shows conclusively that an individual selection tree method or a small group selection method of natural regeneration of Scotch pine gives better results than any clear-cutting method. The new method improved the site-quality from an average of site-quality 4 to an average of site-quality 11, and brought about an increase in increment, yield, and growing stock. The author states that clear-cutting methods are unnatural and interfere with the stability of the forest organism. Individual stem and small group selection methods maintain a natural forest condition and insure the highest possible increment per cent with the highest possible and most valuable growing stock, and therefore with the best possible forest management.—*Joseph S. Illick.*

187. MÜLLER. **Forstliche Mitteilungen aus dem preussischen Solling. [Forestry facts from Solling, Prussia.]** Zeitschr. Forst- u. Jagdw. 52: 247–262. 1920.—Chapters 6 and 7 of a continued article on forestry in Solling. Norway spruce stands are discussed. Establishment of stands by seeding have been successful and economical. Planting of seedlings costs 140 marks per hectare while successful establishment by seeding costs only 78 marks. Mound planting is recommended for clear-cut areas of hardwoods.—*Joseph S. Illick.*

188. MÜLLER. **Gedanken über die Barenthorener Wirtschaft. [Thoughts about forest management on the Barenthor forest.]** Zeitschr. Forst- u. Jagdw. 52: 296–301. 1920.—A review of Oberforstmeister MOLLER's conclusion concerning the natural regeneration of Scotch pine in comparison with results of artificial regeneration.—*Joseph S. Illick.*

189. NEUMEISTER. **Nonnengefahr für Sachsen. [Danger of Nun moth in Saxony.]** Tharander Forst. Jahrb. 72: 62–64. 1920.—The Nonne, or nun moth, did considerable damage to forest trees in Saxony in 1906 and 1912. In 1920 it appeared again in such large numbers in several forest districts bordering Bohemia that special steps must be taken to hold it in check.—*Joseph S. Illick.*

190. PARCHMANN, W. **Die Smaliansche Formel für Inhaltsberechnung von Stämmen und die Beurteilung derselben durch einige seiner Zeitgenossen. [Estimating tree volume by Smalian formula.]** Allg. Forst- u. Jagdzeitg. 95: 109–111. 1919.—A critical discussion of the academic and practical advantages and disadvantages of Smalian's formula for computing the volume of tree stems.—*Joseph S. Illick.*

191. PASSLER, JOHANNES. **Die Bedeutung des Eichenholzes in gerberischen Beziehung und die daraus hergestellten Eichenholzauszüge. [Oak wood and oak wood extract in the tanning industry.]** Forstwiss. Centralbl. 42: 241–249, 306–314. 1920.—Production of tannin from oak wood began about 1883 in Slavonia and Croatia, developed later in France and North America, and during the war was tried in Germany. Results of analyses are given which show that the tannin content increases with age of the tree, and is greatest in the lowest part of the bole. Sapwood contains very little tannin; the greatest amount is in the outer layers of heartwood. Young trees (under 20 years) contain too little tannin to be worked profitably. Tannin content of at least 5 per cent (air-dry weight, moisture content 14.5 per cent) is necessary for profitable operation, but the amount present varies from about 1 per cent in young sprouts, to 13 per cent, rarely exceeding 9 per cent.—The method of making the extract is described, and compositions of various extracts are given. Oak wood extract, which is different from oak bark extract, is very similar to chestnut wood extract, and gives about the same results. It is generally used in combination with chestnut, quebracho, or spruce extract.—*W. N. Sparhawk.*

192. RATTINGER, K. **Die Holzvorräte der Pacifischen Nordwestküste mit besonderer Berücksichtigung von Britisch-Columbien und des südlichen Kieferngebietes der Vereinigten Staaten. [The wood resources of the Pacific Northwest.]** Forstwiss. Centralbl. 42: 293–305, 360–374. 1920.—The forest regions of Canada are described in some detail, and more particularly the Pacific Northwest. For the latter region, including both northwestern U. S. A. and British Columbia, the stands of timber, annual cut, and possible cut, are discussed. The markets for the 2 parts of the region are compared, showing that of the northwest coast woods supplied to countries bordering on the Atlantic Ocean, the United States furnishes $\frac{4}{5}$, while it supplies $\frac{2}{3}$ of the exports to countries bordering on the Pacific (excluding California). The Pacific Northwest and the southern yellow pine regions are compared with respect to amounts of standing timber, annual cut, and annual growth, and the conclusion is drawn that southern pine will soon cease to be a serious competitor of the northwestern woods.—*W. N. Sparhawk.*

193. RAUX, MARCEL. **Le calcul de la perte de valeur d'avenir et la question des réparations forestières. [Calculation of the loss of future value and the question of forest reparations.]** Rev. Eaux et Forêts 59: 1–10. 1921.—Official instructions for determining the reparations due from Germany as a result of forest destruction in France provide for including in the estimated damage the loss of future value in the case of trees or stands destroyed prior to the normal age of exploitation. A simple method of determining this loss without the use of compound interest formulas is as follows: Estimate the volume, and from this the value, of the tree on the basis of its diameter in 1914 and of its normal diameter at maturity (assumed to be 40 cm.). The difference between these values gives the gross loss in future value; and this gross loss divided by the ratio between the value at maturity and the value in 1914, gives the net loss. While this method avoids any determination of the 2 unknowns,—rate of interest and number of years to maturity,—in the usual compound interest formula, it gives precisely the same result, since the ratio between the value at maturity and in 1914, $\frac{V^1}{V}$, is equal to $1.0p^n$ for the diameter selected. It is inaccurate to use a single rate of interest as applying to the yield of a tree or stand throughout its life since the rate varies greatly according to such factors as age, size, and estimated maturity. Thus by the method just described, assuming that a tree increases 5 cm. in diameter every 10 years and that its diameter at maturity is 40 cm., the future yield in the case of oak is found to vary from 66 per cent for trees 15 cm. in diameter to 3 per cent for those 35 cm. in diameter. To illustrate the importance of including the loss of future value in reparation calculations, a typical case is cited in which this value amounted to 30 per cent of the value of the high forest and to 62 per cent of the value of the young reserves.—*S. T. Dana.*

194. REBEL. **Schlagruhe und Rüsselkäfer. [Suspension of cutting and weevils.]** Forstwiss. Centralbl. 42: 335–336. 1920.—Comments on a recent article by SCHEIDTER (see Bot. Absts. 7, Entry 146).—*W. N. Sparhawk.*

195. REUTER, M. **Die Waldweider.** [Forest grazing.] Allg. Forst- u. Jagdzeitg. 96: 40–45. 1920.—As a consequence of the feed shortage during the period of the war, as was also the case in the dry summers of 1893 and 1911, there was a marked increase in forest grazing. The author enumerates the damage to forest growth by grazing animals, and the effect of the latter upon other destructive agents. It is the author's belief that forest grazing will again be reduced to a minimum when normal economic conditions are restored.—*Joseph S. Illick.*

196. RUBNER, K. **Baumkronenform und Schattenfestigkeit.** [Crown form and tolerance.] Forstwiss. Centralbl. 42: 249–258. 1920.—MAYR's law, that a given species needs less light in a warmer climate and more light in a cool climate, is not entirely true. Several trees, notably Scotch pine, spruce, larch, and oaks, increase in tolerance eastward and northward from western Germany, and are also more tolerant at the higher elevations than on the plains. There appears to be a fairly constant relationship between tolerance and form of crown, not only for the species mentioned but also for others, such as the birch, aspen, and Austrian pine. Toward East Prussia and western Russia the crowns become narrower, the trees stand closer together, their boles are more cylindrical, and height growth is more rapid. Moreover, in contrast to conditions prevailing in western Germany, natural reproduction is abundant under the shade of the old stands.—*W. N. Sparhawk.*

197. RUBNER, K. **Die Krisen am Holzmarkt.** [Crises in the timber market.] Forstwiss. Centralbl. 42: 353–360, 405–415. 1920.—The author discusses the relation of the timber market to general economic conditions, and traces the fluctuations in timber imports and in timber prices in the important German states, in relation to cycles of general prosperity and depression. This relationship began with the development of a world trade in timber, in the 1860 decade. Timber has certain advantages over coal, iron, or wheat as an indicator of economic conditions, because coal and iron production and prices, being manipulated by syndicates, do not respond readily to changes in the ratio of demand to supply, while wheat production and prices depend very largely on crop conditions and to some degree upon the tariff. Timber does not have to be marketed if conditions are unfavorable except in certain cases, such as forced cuttings due to wind or other damage.—*W. N. Sparhawk.*

198. RUBNER, K. [Rev. of: BJÖRKENHEIM. **Beiträge zur Kenntnis einiger Waldtypen in den Fichtenwaldungen des deutschen Mittelgebirges.** [Studies of forest types in the spruce forests of central Germany.] Helsingfors, 1917.] Forstwiss. Centralbl. 42: 457–463. 1920.—Björkenheim, working along the same lines as CAJANDER, presents the results of studies of more than 200 spruce stands in the mountain forests of central Germany. He classifies the stands on the basis of the characteristic predominant plants in the surface vegetation (*Oxalis*, *Oxalis-Myrtillus*, *Aira*, *Myrtillus*, *Calamagrostis*). This vegetation, being a resultant of the various site factors, is a very good index of the wood-producing power of the site, as the author shows by correlating height, diameter, and basal area growth of the spruce with the sub-types described. These different sub-types call for different silvicultural treatment.—Rubner says that such conclusions are more applicable to the extensive virgin forests of Finland, northern Scandinavia, and northern Russia, than to the artificial forests of Germany where the natural vegetation has been greatly modified by neighboring cultivation of meadows and agricultural crops. Björkenheim's studies were made in the less disturbed mountain forests. Such studies of the forest vegetation are decidedly worth while because of the new points of view they afford, even though such positive results as those of Cajander and Björkenheim cannot usually be expected.—*W. N. Sparhawk.*

199. SCHÄDELIN, W. VON. **Beiträge zum Kapital Spätfrost.** [Contributions to the discussion of late frosts.] Schweiz. Zeitschr. Forstw. 71: 329–344. *4 pl.* 1920.—Late frosts are common in the higher elevations of Switzerland in the region between the Jura and the Alps, and have a noticeable effect on the forests. An area of about 180 m. by 110 m. at an elevation of 559 to 581 m., was clear-cut. The natural reproduction was seriously frost injured due to the cold air drainage whereas the timber protected the young growth under it. Planted

stock of white pine was also frost injured. A small amount of larch seed was sown and a few trees survived. These are being crowded out by the hardwoods. Hardwood coppice was seriously injured by late frosts. Shoots 3 m. high and of the diameter of a cane were killed. The deepest portions of the area suffered the greatest damage. Heavy frosts occurred as late as June 6 in 1918. It is recommended that the dangerous places be planted with hardy conifers and that they be planted densely in order to provide for possible loss. Some species apparently become more frost hardy, although most of them recover rapidly if the late frosts are at intervals sufficiently long apart.—The species concerned are arranged in order of frost hardiness. The least frost resistant are the walnut, ash, beech, fir, oak, and spruce; medium resistant are the native oak, maple, hornbeam, and elm; the hardy trees are the white pine and the Scotch pine.—*J. V. Hofmann.*

200. SCHAEFFER. **Un essai de futaie jardinée feuille. [A trial of broadleaf selection forest.]** Bull. Trimest. Soc. Forest. Franche-Comté et Belfort 13: 239–247. *1 fig.* 1920.—While coppice under standards is undoubtedly the most widely used method of treatment in France, it has long been recognized that it falls far short of producing the maximum amount of timber. The classic method of converting such stands into high forest is too slow, too complicated, and involves too great a sacrifice of present returns to be practicable. A more feasible method, which is already virtually in use in many places, is to establish by relatively frequent improvement cuttings a selection high forest in which the number of trees is inversely proportional to their diameter. This method, with cuttings about every 15 years, makes it possible to favor the most promising seedlings and saplings, to remove mature trees most advantageously, and to establish a high forest with a good yield of timber without sacrifice of present revenue. Conditions vary so widely that no set rules for applying the method can be laid down, and a thorough knowledge of silviculture is necessary to use it to advantage.—*S. T. Dana.*

201. SCHÜPFER. [Rev. of: REUSS, HERMANN. **Der Forsthaushalt aufgelöst in seine praktischen Einzelverrichtungen auf dem Gebiet der Wirtschaft und Verwaltung.** Leipzig und Wien, 1918.] Forstwiss. Centralbl. 42: 272–273. 1920.—The particular purpose of this book is to acquaint forest owners with the general principles of forest management, and it is written in such a way as to be readily comprehended by persons who have no technical training in forestry.—*W. N. Sparhawk.*

202. SCHWAPPACH. **Der Reichsforstwirtschaftsrat und das forstliche Vereinswesen. [National forestry departments and forestry associations.]** Zeitschr. Forst- u. Jagdw. 52: 140–146. 1920.—A discussion of the scope and results of work of national departments of forestry and forestry associations, including the German forestry association and local associations.—*Joseph S. Illick.*

203. SIEFERT UND HELBIG. **Weitere Ergebnisse der Stickstoffdüngungsversuche mit 2- und 4-jährigen Fichten. [Fertilizer experiments with spruce transplants.]** Forstwiss. Centralbl. 42: 258–261. 1920.—Results of further observations (1914–1917) on the height growth of spruce transplants, some unfertilized and others treated in 1909 with various fertilizers are presented. The plants to which nitrate fertilizers had been applied showed more rapid growth during the first few years, but by 1917 had been almost overtaken by the unfertilized ones, whose actual and percentage growth was at that time considerably greater.—*W. N. Sparhawk.*

204. STEPHANI. **Forstliche Vereine. [Forestry associations.]** Allg. Forst- u. Jagdzeitg. 95: 205–208. 1919.—A suggestive discussion of forestry associations and societies. The need for such associations is outlined, and 3 distinct kinds of associations are recommended: (1) Associations for the promotion of forestry; (2) associations which uphold the interest of forest property owners; (3) associations of forest officers.—*Joseph S. Illick.*

205. STOLP, W. **Impregneeren van hout. [Impregnation of timber.]** De Natuur 41: 69–72. *Fig. 1–4.* 1921.—A general account is given of the impregnation of wood by various agents under normal and high pressure, as practiced in the Netherlands.—*J. C. Th. Uphof.*

206. Trebeljahr. **Kiefern-Dauerwaldwirtschaft.** [Continuous method of handling Scotch pine.] Zeitschr. Forst- u. Jagdw. 52: 289–296. 1920.—A critical discussion of the position taken by Oberforstmeister Möller in recommending the natural regeneration of Scotch pine by a method which he terms continuous forest management.—*Joseph S. Illick.*

207. Vanselow. **Von der Spessarteiche.** [The Spessart oak.] Forstwiss. Centralbl. 42: 345–353. 1920.—The Spessart oak is the most valuable product of German forestry. Its wood is in great demand for furniture and brings extremely high prices,—9560 marks per cubic meter in 1920 for 1st class material, and 6995 marks per cubic meter for all grades, as compared with 82 marks in 1901. Being grown on a rotation of from 200 to almost 500 years, the trees are exceptionally large and straight, with boles clear of branches for 20 to 25 meters and with a diameter of from 2 to 4 feet. The oak is usually started in pure stands, and underplanted with beech after it is about 100 years old. Another method is to start both oak and beech at the same time. Each method has certain advantages and disadvantages, but both have shown that beech is absolutely essential for the best development of the oak when grown on such long rotations. Silvicultural treatment of the stands is discussed in some detail.—*W. N. Sparhawk.*

208. Vater. **Der Kalkgehalt des Bodens und die Buche.** [Lime content of soil and beech.] Tharander Forst. Jahrb. 71: 319–329. 1920.—Beech requires more lime than fir, spruce, or pine. Schroder found that a pure stand of beech on an average site requires annually 41.7 kg. per acre, while fir requires only 33.5, spruce 28.4, and pine 10.6 kg. Only a portion of the lime absorbed goes into the wood; most of it goes into the leaves and with their fall and decomposition again becomes available. Of all the principal European forest trees the beech most completely checks the leaching out of the soil. It is a protector of the soil, and lime will stimulate its growth.—*Joseph S. Illick.*

209. Whitford, H. N. **The Patagonian forests.** [Rev. of: Rothkugel, Max. **Los Bosques Patagonicos.** Buenos Aires, 1916.] Geog. Rev. 11: 141. 1921.

210. Wilbrand, R. **Wald und Rente.** [The forest and income.] Allg. Forst- u. Jagdzeitg. 95: 197–200. 1919.—A discussion of the real goal of municipal forests, and a technical discussion of various forms of forest management and forest income. Financial consideration must not overshadow other important and essential factors. The city of Düsseldorf bought from the state of Prussia a tract of forest land, for which 2,000 marks per acre were paid for the soil alone and an additional amount for the growing stock. It is estimated that the best financial return that can be hoped for is about 0.75 per cent on the capital invested. The city of Giessen in Hessen bought city forest land for 1184 marks per acre, of which only 236 marks was figured for the soil value. In spite of the high price paid for the land, the purchases are justified fully by the indirect benefits, which the author believes should be given greater weight than the financial consideration. In an appended short review Dr. Wimmenauer concurs with most of the author's conclusions.—*Joseph S. Illick.*

211. Wilbrand. **Waldrechnung und Weltrechnung.** [Forest finance and world finance.] Zeitschr. Forst- u. Jagdw. 52: 337–342. 1920.—A general discussion of the influence of the rate of exchange, rise in price, and other economic factors on forest finance and general world finance. The article shows the effect of compound interest calculations in normal times and compares the period of the war and since the war with pre-war prices and conditions.—*Joseph S. Illick.*

212. Wimmer. [Rev. of: Rubner, Konrad. **Die Bewegung der Holzpreise in Deutschland vom Beginn des Weltholzhandels bis zum Welt-Krieg.** (Movement of timber prices in Germany.) Neudamm, 1920.] Forstwiss. Centralbl. 42: 453–456. 1920.—A very comprehensive and detailed study, with diagrams and tables, of timber prices in all of the German states for which such figures are available for the period 1875–1914. Economic laws governing the formation of timber prices are discussed, and the relation between such prices and the general economic situation is shown.—*W. N. Sparhawk.*

213. Witzgall, L. **Der Langenbrander Schirmkeilschlag von Forstmeister Dr. Eberhard und der Wagnersche Blendersaumschlag in Gaildorf. [The Langenbrand shelterwood wedge cutting and Wagner's selection strip cutting.]** Forstwiss. Centralbl. 42: 431–436. 1920.—A discussion and comparison of these 2 silvicultural methods, both of which aim to establish the new stand by means of natural reproduction.—*W. N. Sparhawk.*

214. Zwilling, C. **La conversion des taillis sous futaie du département de la Moselle en haute futaie. [Conversion of coppice under standards into high forest in the department of Moselle.]** Rev. Eaux et Forêts 59: 33–39. 1921.—In 1830 the French forest administration began the conversion into high forest of a part of the 32,600 hectares of broadleaf national forests in the department of Moselle. These had previously been managed as coppice under standards, as are most of the communal and private forests today. The rotation of the coppice was reduced from 25 or 35 to 20 years and the number of reserves was gradually increased during successive cuttings so as to form a selection high forest. The work was continued by the Germans after the annexation of Alsace-Lorraine, but in 1882, as a result of decreased prices for fuel wood, they made the mistake of undertaking the conversion of all the national forests. This resulted in failure on the thin, clayey soils not suited to the production of broadleaf high forests. Another later mistake, which was, however, soon rectified, was the application of a rigid diameter limit, sometimes with disastrous results. Aside from this the forests under conversion were in general well cared for. Thinnings as well as reproduction cuttings were used in effecting the conversion and were carried out in the lower as well as the upper story. Double high forests were often established in which the rotation of the upper story, usually oak, was twice that of the lower story, usually beech, with both of which natural regeneration was comparatively easy. The execution of the various cuttings was greatly facilitated by the fact that under the German administration the logging was done by the government, which, because of its direct interest in the results, was able to handle the work more effectively than private operators.—*S. T. Dana.*

GENETICS

George H. Shull, *Editor*
James P. Kelly, *Assistant Editor*

(See also in this issue Entries 2, 6, 7, 12, 18, 29, 30, 47, 48, 52, 62, 92, 94, 164, 286, 305, 316, 319, 331, 338, 339, 342, 382, 402, 452, 453)

215. Anonymous. [Rev. of: Babcock, E. B., and R. E. Clausen. **Genetics in relation to agriculture.** *15 × 23 cm., xx + 675 p., 4 colored pl., 239 fig.* McGraw-Hill Book Co.: New York, 1918 (see Bot. Absts. 1, Entry 210, 220, 244; 2, Entry 233; 3, Entry 446).] Sci. Prog. [London] 14: 169–171. 1919.

216. Anonymous. **Heredity and social fitness.** [Rev. of: Key, Wilhelmine E. **Heredity and social fitness; a study of differential mating in a Pennsylvania family.** Carnegie Inst. Washington Publ. 296. *102 p., 2 folded diagrams.* 1920 (see Bot. Absts. 9, Entry 239).] Nature 106: 360–361. 1920.

217. Arey, Leslie B. **On monozygotic human twins.** [Abstract.] Anat. Rec. 21: 44. 1921.—Two specimens of early monozygotic human twins, each case unique of its kind, are presented. The first comprises 2 embryos, each 12.3 mm. long, contained within a single amnion and chorion; except for some shrinkage of the entire specimen, the embryos are normal. Each possesses its own umbilical cord and yolk-stalk; the latter are inserted separately on a common yolk-sac. This furnishes for the first time direct proof of the origin of human identical twins from a single ovum. The second specimen is of normal monochorionic twin embryos, each lying within its own amnion. One member of the pair (11.5 mm. in length) has a normal yolk-stalk and sac (4.5 × 6 mm.); the other individual (12 mm. long) lacks these structures completely, as gross and microscopic examination prove. Certain inferences are

suggested: (1) Human monozygotic twins do not result from the separation of blastomeres or blastomere clusters at the earliest stages of cleavage, but from a later fission of the inner cell mass. (2) Nevertheless, the human ovum appears to be rather rigid or determinate in its development; at least, in this case one embryo received all the yolk-sac formative cells. (3) The yolk-sac is not necessary for growth or differentiation; in fact the twin individual lacking a yolk-sac is slightly the larger, while the correlation of menstrual age and body size coincides with the norm. (4) The yolk-sac and stalk are not prerequisite to vasculogenesis; here was performed, as perfectly as ever may be expected, a natural experiment of ablation which demonstrates the independence of the embryo from such angioblastic ingrowths.—*Leslie B. Arey.*

218. Banta, A. M., and Mary Gover. **Analysis of the sexual modifications of an appendage in sex-intergrade Daphnia longispina.** [Abstract.] Anat. Rec. **17**: 348–349. 1920.—A detailed analysis of one of the appendages, the first leg, which is subject to wide modification in secondary sex characteristics in sex-intergrade strains of *Daphnia longispina* brings out the following facts: (1) Every detail of this appendage which is subject to sexual modification is also subject to intermediate development in sex-intergrade individuals; (2) the intermediate development of any portion of this appendage may represent any condition from a just distinguishable modification from that characteristic of the normal female to a condition approaching the normal male condition; (3) the different portions of the same individual appendage may show a range from fully female to moderately male in character, or from an intermediate condition to a fully male condition; (4) there is usually, however, a certain amount of correlation between the amount of maleness and femaleness manifest in the different portions of the same appendage, although this correlation is not sufficient to enable one to make a safe prediction from the amount of maleness manifest in one portion as to the condition of the other sexually modified portions of the same individual appendage.—*A. M. Banta and Mary Gover.*

219. Burger, O. F. **Variations in Colletotrichum gloeosporoides.** Jour. Agric. Res. **20**: 723–736. *Pl. 86.* 1921.—The fungus, *Colletotrichum gloeosporoides* Penz., as found in California, is a species composed of many strains. Forty-six isolations were studied and placed in 5 different groups based on mycelial growth and nature of spore production. Since characteristics of some cultures changed, a reclassification frequently became necessary. The various strains also differed in the modal length of the spores regardless of the group. The growth characteristics and size of spores varied with the media on which the strains were grown. In certain cultures the author considered that mutations arose.—*W. H. Burkholder.*

220. Burns, W. **Some aspects of plant genetics.** Proc. Seventh Indian Sci. Congress 1920: 88-109. 1921.—Presidential address before the Botany Section of the Indian Science Congress at Nagpur, India, January, 1920. Also published in the Agric. Jour. India [see Bot. Absts. 7, Entry 868].—*Winfield Dudgeon.*

221. C., J. C. **Een Botanische Puzzle.** [**A botanical puzzle.**] De Natuur **41**: 39-40. *4 fig.* 1921.—Mr. J. K. Budde, the curator of the Botanical Garden of Utrecht, found a monstrosity in a pear. From its outward appearance, the fruit is composed of different divisions, following one another. The fruit had not developed seed.—*J. C. Th. Uphof.*

222. Czaja, A. Th. [German rev. of: Fleischer, Max. **Über die Entwicklung der Zwergmännchen aus sexuell differenzierten Sporen bei den Laubmoosen. (Development of dwarf males from sexually differentiated spores of the mosses.)** Ber. Deutsch. Bot. Ges. **38**: 84–92. *1 pl.* 1920.] Zeitschr. Bot. **13**: 250–251. 1921.

223. Dahlgren, K. V. Ossian. **Nedärvning av heterostyli.** [**On heredity of heterostyly.**] Svensk Bot. Tidskr. **15**: 166. 1921.—Lecture given in the botanical section of the Natural Science Society of students in Uppsala, Nov. 11, 1919. In *Fagopyrum esculentum* the brevistyled form is normally homozygous, and the longistyled one heterozygous.—*K. V. Ossian Dahlgren.*

224. Dahlgren, K. V. Ossian. **Pelargonium-chimär. [A Pelargonium chimera.]** Svensk Bot. Tidskr. 15: 171. 1921.—Lecture given in the botanical section of the Natural Science Society of Uppsala, Sept. 28, 1920. In a *Pelargonium* chimera in the botanical garden in Uppsala a shoot was found which had the green and the chlorophyll-defective parts of tissue interchanged.—*K. V. Ossian Dahlgren.*

225. Dahlgren, K. V. Ossian. **Självsteriliteten hos Lysimachia nummularia. [On self-sterility of Lysimachia nummularia.]** Svensk. Bot. Tidskr. 15: 164. 1921.—Lecture given in the botanical section of the Natural Science Society of students in Uppsala, April 29, 1911. Pollination between individuals from different countries caused fructification.—*K. V. Ossian Dahlgren.*

226. Daniel, Lucien. **Réactions antagonistiques et rôle du bourrelet chez les plantes greffées. [Antagonistic reactions and the rôle of the fusion layer in vegetable grafts.]** Compt. Rend. Acad. Sci. Paris 170: 1512–1515. 1920.—Every true graft leads to the formation of a fusion layer at the union of stock and scion. This layer modifies conduction and establishes an antagonism between the parts, without which the grafts would be unable to live. As a result, the stock and scion are in different biological states. An examination of grafts has shown that there may be a passage of certain substances and a retention of others at the layer, or either a passage or retention of the same reserve product. These translocations of substances, with the resulting changes in biological states, have caused many unusual variations, particularly in the mode of development of the restorative parts. Adventitious roots or branches which develop may be of the true nature of stock or scion, or may in exceptional cases form graft hybrids. Various types of behavior of these restorative growths, both of roots and branches, are described.—*A. C. Fraser.*

227. Ernst, A. [German rev. of: Hoar, C. S. **Sterility as the result of hybridization and the condition of pollen in Rubus.** Bot. Gaz. 62: 370–388. *3 pl.* 1916.] Zeitschr. Bot. 13: 260. 1921.

228. Grier, N. M. **Notes on Hemerocallis, II.** Torreya 21: 12–13. 1921.—The writer presents the results of a series of experiments made in 1917 on *Hemerocallis fulva*, to determine whether the plant sets seed. Four groups of experiments were conducted: (1) Fertilization of the flowers with their own pollen; (2) fertilization with pollen from the same clump of day-lilies; (3) fertilization with pollen from a far-removed clump; (4) fertilization with pollen from *H. flava*. The results were in all cases negative. No mature seeds were ever found.—*J. C. Nelson.*

229. Harder, R. [German rev. of: (1) Sperlich, Adolf. **Die Fähigkeit der Linienerhaltung (phyletische Potenz), ein auf die Nachkommenschaft von Saisonspflanzen mit festem Rhythmus ungleichmässig übergehender Faktor. (Capacity to maintain lines (phyletic potency), a factor distributed irregularly to the offspring of plants with fixed seasonal rhythm.)** Sitzungsber. Akad. Wiss. Wien 128: 379. 1919.—(2) Idem. **Über den Einfluss des Quellungszeitpunktes, von Treibmitteln und des Lichtes auf die Samenkeimung von Alectorolophus hirsutus All.; Charakterisierung der Samenruhe. (On the influence of the time of application of forcing-agents and of light on the germination of seeds of Alectorolophus hirsutus. Characterization of seed rest.)** Sitzungsber. Akad. Wiss. Wien 128: 477. 1919.] Zeitschr. Bot. 13: 264–266. 1921.—[See also Bot. Absts. 4, Entry 3412.]

230. Hector, G. P. **Report of the Imperial Economic Botanist.** Sci. Rept. Agric. Res. Inst. Pusa 1919–20: 46–57. 1920.—Tests of varieties of wheat developed at Pusa are continued for yield, strength of straw, and rust resistance.—Wilt in *Indigofera tinctoria* (indigo) is found to be due to poor root development brought on by water-logging. New root and nodule formation begins in April, and proceeds slowly till the monsoon begins, and is then rapid. Java indigo is being improved by mass selection, as plants under bags do not produce seeds.—*Linum usitatissimum* (flax) is self-pollinated; breeding and selection are in progress. Breeding

and selection are in progress on *Nicotiana tabacum* and *N. rustica* (tobacco), *Cicer arietinum* (gram), *Hibiscus cannabinus* (patwa), *Carthamus tinctorius* (safflower), *Dioscorea* spp. (yam.), and *Oryza sativa* (rice).—Chlorosis in *Corchorus* (jute) is believed to be hereditary; "The facts tend to show that it is possibly a case of maternal inheritance, the disease being passed on through the cytoplasm of the egg-cell." A form of chlorosis common in *Cajanus indicus* (arhar) apparently behaves similarly.—A program of work for 1920–21, and a list of publications for the year are given.—*Winfield Dudgeon.*

231. Hirsch. [German rev. of: Tschermak, A. von. **Über das verschiedene Ergebnis reziproker Kreuzung von Hühnerrassen und über dessen Bedeutung für die Vererbungslehre. (Theorie der Anlagenschwächung oder Genasthenie.) (On the different results of reciprocal crossing of races of domestic fowl and on their significance for the theory of heredity. Theory of weakening of the genes or genasthenia.)** Biol. Zentralbl. 37: 217–277. May, 1917.] Arch. Rassen- u. Gesellschaftsbiol. 13: 309–310. 1921.

232. Hofsten, Nils von. **Modern ärftlighetslära. [Modern genetics.]** Svenska sällskapets för Rashygien skriftserie III-IV. *14 × 22 cm., 60 p., 23 fig.* P. A. Norstedts & Söners förlag: Stockholm, 1920.—A popular essay on some important results.—*K. V. Ossian Dahlgren.*

233. Holmberg, Otto, R. **Anteckningar till nya skandinaviska floran. [Notes to a new Scandinavian flora.]**—Bot. Notiser 1920: 161–166. 1920.—Some *Equisetum* hybrids are critically discussed.—*K. V. Ossian Dahlgren.*

234. Johansson, K. **Was ist unter dem Namen Ulmus montana With. var. nitida Fr. zu verstehen. [What is to be understood under the name Ulmus montana With. var. nitida Fr.]** Bot. Notiser 1921: 71–73. *2 fig.* 1921.—A diagnosis and description of the bastard *Ulmus foliacea* Gilib × *glabra* are given.—*K. V. Ossian Dahlgren.*

235. Johnson, James. **Inheritance of disease resistance to Thielavia basicola.** [Abstract.] Phytopathology 11: 49. 1921.—Study of crosses between susceptible and resistant varieties have shown that inheritance of resistance, in this instance, does not follow a simple Mendelian ratio.—*B. B. Higgins.*

236. Jones, D. F. **A paraffine ruler for drawing curves.** Science 51: 245. 1920.—Points of desired curve are plotted on paper, placed over smooth board, and slender nails driven in at each point. Flexible strip of whalebone, metal, or bristol-board is bent around nails to fit curve, and held upright by other nails. This furnishes mould for paraffine cast of curve.—*Merle C. Coulter.*

237. Jones, Sarah V. H., and James E. Rouse. **The relation of age of dam to observed fecundity in domesticated animals.** Jour. Dairy Sci. 3: 260-290. *4 fig.* July, 1920.—Data are presented on beef cattle (Hereford and Aberdeen Angus) and sheep (Wisconsin Station flock) to prove that increasing the age of the dam up to a certain limit increases the occurrence of multiple births. Literature is cited to support this conclusion in other species.—The records for the Hereford and Aberdeen Angus breeds are taken from the herd books including the first 42 volumes for the Hereford and the first 26 volumes for the Aberdeen Angus. They show, aside from the major thesis, that 4.52 Hereford births per 1000 of herd-book records and 4.11 Aberdeen Angus births per 1000 of herd-book records are twins. A total of only 7 triplets and 1 quadruplet are recorded in either breed.—In sheep the multiple births per 1000 are 482.91 with 40.20 of these triplets.—*John W. Gowen.*

238. K., J. [Rev. of: Steinach, E. **Verjüngung durch experimentelle Neubelebung der alternden Pubertätsdrüse. (Rejuvenation through experimental revitalization of the senile sex glands.)** *68 p., 9 pl.* Julius Springer: Berlin, 1920.] Endocrinology 5: 238. 1921. See also Bot. Absts. 9, Entry 258.]

239 Key, Wilhelmine E. **Heredity and social fitness; a study of differential mating in a Pennsylvania family.** Carnegie Inst. Washington Publ. 296. *102 p., 2 folded diagrams.* 1920.—Object of the investigation was twofold: "First, to determine the mode of evolution of the various lines of a great network with reference to traits which have direct bearing on social efficiency; second, to study the variation in the grade of these traits and the relation of this variation to the types of mating." The study is based on 1,822 individuals constituting 2 family networks of western Pennsylvania chiefly descended from 2 pairs of German immigrants of more than a century ago. There is given about 70 pages of detailed family history with characterizations of individuals and accompanied by 2 complete pedigree charts. Seven lines of descent or strains are made out which show diverse types of evolution, some to increased social efficiency and others to differing forms of degeneracy but each related to the type of marriage selection involved.—An attempt is made to express the distribution of certain traits in terms of Mendelian inheritance. Calculating ability is shown to behave as the expression of Mendelian dominance. "The assumption of a unit-character of varying potency, or better, of a number of determiners which behave in unit-like fashion, would appear to explain the phenomenon of inheritance for calculating ability as observed in these networks." Aggressiveness and perseverance are less satisfactorily shown to segregate in accordance with Mendel's law for presence or absence of determiners in the germ-plasm—The several lines are compared statistically with reference to: (1) Social efficiency, showing striking divergence; (2) fecundity, which shows a noticeable drop in later generations of all lines, but no more striking in the socially efficient lines than in the degenerate lines; (3) survival increases relatively in the socially efficient lines and decreases in the degenerate lines; (4) differential migration, the more efficient migrating. Comparison of environmental opportunities with inherent tendencies seems to indicate the greater potency of the latter. [See also Bot. Absts. 9, Entry 216.]—*Howard J. Banker.*

240. Kniep, H. [German rev. of: Hertwig, Oscar. **Allgemeine Biologie. (General biology.)** *6th improved and enlarged ed., 8 vo, xvi + 800 p.* Gustav Fischer: Jena, 1920.] Zeitschr. Bot. 13: 173–174. 1921.

241. Kottur, G. L. **Cross-fertilization and sterility in cotton.** Agric. Jour. India 16: 52–59. 1921.—Adaptations of cotton flower to both self- and cross-pollination are described and predominance of self-fertilization noted. Vicinism amounting to 6 per cent was observed when 2 easily distinguishable strains were grown side by side at Dharwar, India. Occurrence of several manifestations of sterility, notably empty anthers and abortive ovules, was observed in naturally pollinated stocks of Indian cottons; controlled self-fertilization during 6 generations did not increase these nor the rate of boll-shedding.—*T. H. Kearney.*

242. Kristofferson, Karl B. **Undersökning av F_1 och F_2 generationerna av en spontan bastard mellan vitkal och grönkal (mit deutschen Résumé). [Investigation of F_1 and F_2 generations of a spontaneous hybrid between white cabbage and green cabbage (with a summary in German).]** Sveriges Utsädesf. Tidskr. 1921: 31–52. *8 fig.* 1921.—The hybrid was very intermediate. The leaves of the parent plants had a green midrib, which, however, in white cabbage became light red in the autumn. F_1 has a dark red violet color. In F_2 a segregation into dark red violet, light red violet, and green nerves takes place according to the ratio 9:3:4. Many characters show a continuous segregation in F_2 with the qualities of the parents as extremes. As to other characters the segregation was transgressive. Chlorophyll varieties were observed. In spite of the fact that F_2 included nearly 14000 individuals no plants similar to the grandparents were obtained. Some F_2 plants resembled old seedsmen's varieties of cabbage.—*K. V. Ossian Dahlgren.*

243. Lécaillon, A. **Sur les changements qu'on observe dans la reproduction et le développement des Bombyx polyvoltins de Chine lors-qu'ils sont transportés et élèves en France. [On the changes observed in the reproduction and development of polyvoltine Bombyx of China when they are raised in France.]** Compt. Rend. Acad. Sci. Paris 168: 529–531. Mar., 1919.—The author observes that under the climatic conditions of France, Chinese polyvoltin silk-

worms become in course of time (30 years or so) bivoltins with a tendency to univoltinism. After bivoltinism is seemingly established certain batches of eggs showed irregularity of development producing both univoltins and bivoltins, the former being winter eggs, the latter producing a second series of eggs,—summer eggs,—namely, accidental trivoltins. The latter could be reared only by artificially raising the temperature. Hence under direct influence of climate, number of generations can be reduced or multiplied as case may be.—*Isabel McCracken.*

244. Lehmann. [German rev. of: Bateson, W., and Ida Sutton. **Double flowers and sex linkage in Begonia.** Jour. Genetics 8: 199–207. *Pl. 8.* 1919 (see Bot. Absts. 3, Entry 208).] Zeitschr. Bot. 13: 262–263. 1921.

245. Lehmann. [German rev. of: Heribert-Nilsson, Nils. **Zuwachsgeschwindigkeit der Pollenschläuche und gestörte Mendelzahlen bei Oenothera Lamarckiana. (Rate of growth in pollen-tubes and deranged Mendelian ratios in Oenothera Lamarckiana.)** Hereditas 1: 41–67. *1 fig.* 1920 (see Bot. Absts. 6, Entry 1689; 7, Entry 1691).] Zeitschr. Bot. 13: 99–102. 1921.

246. Lehmann, E. [German rev. of: Ishikawa, M. **Studies on the embryo sac and fertilization in Oenothera.** Ann. Bot. 32: 279–317. 1918 (see Bot. Absts. 1, Entries 482, 979, 980).] Zeitschr. Bot. 13: 97–99. 1921.

247. Lehmann. [German rev. of: Kanda, M. **Field and laboratory studies of Verbena.** Bot. Gaz. 69: 54–71. *4 pl., 26 fig.* 1920.] Zeitschr. Bot. 13: 262. 1921.

248. Lehmann. [German rev. of: Stout, A. B. **Intersexes in Plantago lanceolata.** Bot. Gaz. 68: 109–133. *Pl. 12–13.* 1919 (see Bot. Absts. 3, Entry 1517).] Zeitschr. Bot. 13: 261. 1921.

249. Linhart, George A. **A simplified method for the statistical interpretation of experimental data.** Proc. Nation. Acad. Sci. 6: 682–684. 1920.—Data now in press are cited as showing that all the types of frequency curves thus far published, excepting those having a zero class, conform to the mathematical expression

$$\frac{y}{y_0} = e^{-K^2\left(\log \frac{m}{m_0}\right)^2}$$

when m denotes the numerical value of any measurement, m_0 the value of the mean, e the base of natural logarithms, y any frequency, and y_0 a frequency of the probability of a deviation zero. From this equation, formulae for the mean, standard deviation, etc., are derived.—*John W. Gowen.*

250. Lotka, A. J. **Evolution and irreversibility.** Sci. Prog. [London] 14: 406–417. 1920.—Author's summary follows: "It has been pointed out by biologists that organic evolution is an irreversible process. Physicists also have spoken of the second law of thermodynamics broadly as the law of evolution. In inorganic physical systems irreversible processes are attended with a decrease in certain functions of the variables defining the state of the system. In the case of organic systems we have not, in general, any such definite criteria for irreversibility or for equilibrium. In the present contribution a broad formulation of evolution, organic or otherwise, is presented in analytical form. From this it is shown that, for certain cases, functions of the variables X and the parameters P defining the state of the system, and of the coefficients a defining its characteristic properties, can be indicated, which have the property, in the neighborhood of stable equilibrium, of diminishing in the (irreversible) process of the evolution of the system, and of assuming a minimum when stable equilibrium is established. In these cases, therefore, it is possible to define in exact terms the *direction* of evolution, whereas the descriptions ordinarily given of this direction (passage from lower to higher, from simpler to more complex forms, etc.) are vague or inaccurate."—*R. E. Clausen.*

251. Lundborg, H. **Svenska folktyper, bildgalleri ordnat efter rasbiologiska principer och med en orienterande översikt. [Swedish types, portrait gallery arranged on race-biological principles and with a short general survey.]** *23 × 51 cm., 236 p., 6 colored tables.* 1920.—On pages 5–12 Swedish folk and race-types are treated and pages 233–235 contain a chapter on "The study of Swedish folk-types, an important part of family and native-place studies." The other pages contain a portrait gallery, generally with 4 figures on each page. The material is disposed in the following groups: (1) Lapponians, (2) Norrbotton-Finns and Finnish types among the Swedish population in Sweden and in parts of Finland with Swedish inhabitants; (3) pure northern types and Swedish mixed types in Sweden, Finland, and at Runö; (4) descendants of Walloons in Sweden; (5) Swedish Jews; (6) Gypsies; (7) vagabonds, criminals and such; (8) as an appendix photos are given of a number of foreigners who have been living in Sweden for a shorter or longer time but have been punished or expelled because of vagabondage or criminality. Some of these have left descendants in Sweden.—*K. V. Ossian Dahlgren.*

252. MacBride, E. W. **The inheritance of acquired characters.** Sci. Prog. [London] **15**: 392–405. Jan. 1921.—An argument for Lamarckian factor in evolution, based upon a variety of considerations. There is a lack of evidence to support Weismann's insistence upon separation of "germ-plasm" from "soma-plasm".in ontogeny. All nuclei produced by division of egg nucleus are potentially alike; what undergoes differentiation is not nucleus but cytoplasm.—The mutations appearing in cultures of Mendelians "practically all represent deficiencies and pathological aberrations totally unlike the marks which separate natural species from one another." Experimental studies of selection in pure lines indicate that selection alone, when the environment remains constant, is powerless to effect evolution. Inheritance of effects of use and disuse appears as the only alternative.—Arguments from palaeontology and embryology are cited in favor of Lamarckian view, an example of the second being the inheritance of curvature of abdomen of hermit-crab, even if latter is prevented from finding a spiral shell. Considerable space is devoted to Kammerer's experiments, which the author does not consider discredited by attacks of Bateson and others. Experiments of Guyer and Smith are likewise stressed, and much significance is attached to the latter's suggestion that the degenerating eyes may themselves originate anti-bodies which in turn affect the germ-cells. If this view is accepted, says MacBride, the cardinal principle of the theory of the inheritability of acquired characters is conceded.—*F. B. Sumner.*

253. Mann, Harold H. **Variation in the flower of Jasminum malabaricum Wight.** Jour. Linnean Soc. London Bot. **45**: 155–158. 1920.—Author reports observations on variability of calyx and corolla and on degree of correlation between numbers of their lobes. Corolla lobes ranged from 5 to 12 with average of 7.75 lobes and coefficient of variability of 12.2 per cent. Calyx teeth ranged from 4 to 8 with average of 5.52 lobes and coefficient of variability of 3.52 per cent. No relationship was observed between calyx-lobe number and position on branch. Different plants may show different modal values. There was only a very slight tendency for number of corolla lobes to increase as number of calyx lobes increased, and *vice versa*, since coefficient of correlation was only + .1148.—*James P. Kelly.*

254. Marshall, Lucile. **Contributions of the plant breeder to the vegetable garden.** Amer. Bot. **27**: 8–17. 1921.—A brief account of 23 vegetables responding to the methods of plant and seed breeders in their effort to improve vegetable seeds.—*S. P. Nichols.*

255. Matthaei, R. [German rev. of: Goldschmidt, Richard. **Mechanismus und Physiologie der Geschlechtsbestimmung. (The mechanism and physiology of sex determination.)** *251* p., *113 fig.* Gebrüder Bornträger: Berlin, 1920.] Zeitschr. Allg. Physiol. **19**: 52–53. 1921.

256. Matthaei, R. [German rev. of: Ružička, Vladislav. **Restitution und Vererbung. Experimenteller kritischer und synthetischer Beitrag zur Frage des Determinationsproblems. (Restitution and heredity. Experimental, critical and synthetic contribution to the problem of determination.)** Vortr. u. Aufsätze über Entwicklungsmech. Org. 23. *69 p.* 1919.] Zeitschr. Allg. Physiol. **19**: 48–49. 1921.

257. Matthaei, R. [German rev. of: Steinach, E. **Verjüngung durch experimentelle Neubelebung der alternden Pubertäts-Drüse. (Rejuvenation through experimental revitalization of the senile sex glands.)** Arch. Entwicklungsmech. **46**: 557–619. *9 pl., 7 fig.* 1920.] Zeitschr. Allg. Physiol. **19**: 50–52. 1921. [See also Bot. Absts. 9, Entry 238.]

258. Matthaei, R. [German rev. of: Dürken, Bernard. **Versuche über die Erblichkeit des in farbigem Lichte erworbenen Farbenkleides der Puppen von Pieris brassicae. (Studies on the inheritance of the coloration induced in the pupae of Pieris brassicae by colored light.)** Nachrichten K. Ges. Wiss. Göttingen 1919.] Zeitschr. Allg. Physiol. **19**: 49–50. 1921.

259. Milojevic, Borivoje Dim. **Sur le protoplasma génératif chez Gregarina cuneata. [On the generative protoplasm of Gregarina cuneata.]** Compt. Rend. Soc. Biol. **84**: 99–100. 1921.—Encysted *Gregarina cuneata* normally possess 2 nuclei, the behavior of which the author follows through the sexual cycle. Karyosomes lose their staining capacity and the nuclei increase in size. Around the nuclei is formed a hyaline and a very dense area which the author interprets as generative protoplasm. Hyaline area is formed by the fusion of the walls of cytoplasmic alveoli, the latter disappearing; this begins near wall of primary nuclei and extends outward. As the above appears the nuclei disintegrate and, in connection with the karyosome, the primary generative nucleus appears. This nucleus leaves the karyosome (the remains) and passes into the hyaline area. It is only there that it divides and gives rise by way of mitosis to all the other generative nuclei, the future nuclei of the gametes. This hyaline area, crammed with little vesicular nuclei, becomes peripheral in the cyst. The author thinks cytoplasm plays rôle in heredity because differentiated at the same time as generative nucleus.—*C. L. Parmenter.*

260. Mosséri, V. M. **Note sur la purification et l'amélioration des cotons égyptiens. [Purification and improvement of Egyptian cottons.]** Bull. Agric. Algérie-Tunisie-Maroc Ser. II, **27**: 6–10. 1921.—Causes of deterioration of Egyptian cotton are discussed and a plan outlined for improvement by selection.—*T. H. Kearney.*

261. Nilsson-Ehle, H. **Multiple allelomorphe und Komplexmutationen beim Weizen. (Untersuchungen über Speltoidmutationen beim Weizen II.) [Multiple allelomorphism and complex mutations in wheat (studies on speltoid mutations in wheat II).** Hereditas **1**: 277–311. 1920.—Several multiple allelomorphs in wheat are discussed. (a) Glume characters,—pubescent, half-pubescent, and glabrous. Pubescence is dominant over half-pubescence and glabrousness, and half-pubescence over glabrousness, with F_2 segregating 3:1 in each case. (b) Spike characters,—beardless, half-bearded, and bearded. The last 2 types originated from the 1st through complex mutation and linkage. Beardlessness is dominant over the other 2, and half-bearded over bearded; segregation, 3:1 in F_2. (c) Speltoid mutations,—normal type, beardless speltoid, and bearded speltoid. This multiple allelomorphism is brought about by complex mutation, i.e., a simultaneous mutative change in several Mendelian genes, being true mutations in fact. The bearded speltoid arises through complex mutation from the normal type, but the genes in question are closely linked, and therefore the possible recombinations,—the bearded normal and beardless speltoid,—seldom appear in the progeny of heterozygotes. A dense eared sub-*compactum* type arises in such progeny somewhat more frequently. *Compactum* factor is interpreted as less closely linked to other mutated factors. At least 3 genes are assumed to mutate at the same time. The author adds a theoretical discussion of nature of complex mutations and their relationships to pleiotropy, dominant and recessive characters, presence and absence theory, and evolution.—*C. E. Leighty.*

262. Nutting, C. C. **The relation of Mendelism and the mutation theory to natural selection.** Science **53**: 129–131. 1921.—The author aims to show that modern studies of genetics have left the natural selection theory practically as it was left by Darwin. His contentions may be summarized in 2 of his sentences: "Just as Mendelism has to do with the *mechanism* and not the *fact* of heredity, so the mutation theory deals with the *nature* and not the *fact* of variations. Neither, in my opinion, has any implication that is antagonistic to the theory of natural selection."—*F. B. Sumner.*

263. Oppenheim, J. D. **De erfelijkheid van het vrueg of laat bloeien bij erwten.** [**Inheritance of early and late flowering in peas.** Mededeel. Ver. Bevord. Wetenschap. Teelt 10. *5 p.* 1921.—The node at which individuals of a certain pure line start flowering is strikingly constant, though often fluctuating within 3 nodes. Other pure lines produce their first flower always at a certain node. Early-flowering varieties, such as Extra Early Pilot-pea, start at the 8th node, Sutton's Emerald Gem at 9th to 10th, Senator 10th to 11th. The later-flowering varieties such as Pois Ture, begin at the 17th to 19th and the Blue-flowering pea at the 18th to 19th node.—In crosses, the F_2 splits to early and late, the late being dominant in F_1.—*J. C. Th. Uphof.*

264. Papanicolaou, George N. **Developmental competition in its relationship to the sex ratio.** [Abstract.] Anat. Rec. 21: 76. 1921.—The average sex ratio in a stock of 3472 guinea-pigs is 106.54 when the individuals born in all litters are considered. On comparing the ratios from different-sized litters great discrepancies are found. In litters of 1 the sex ratio is 112.58; in litters of 2, 112.07; in litters of 3, 97.95; in litters of 4, 108.73; and in litters of 5, 141.02. These variations may be explained on the following principles derived from a careful analysis of the developmental conditions in guinea-pigs: 1. There is a competition between developing germ-cells and embryos in the ovary and the uterus. 2. In the competition males have some advantage over the females. 3. Competition is higher in the larger litters (by a litter is meant the number of co-developing germ-cells and embryos). 4. In litters consisting of embryos of the same sex competition is higher than in mixed litters. 5. The competition is stronger among females than among males.—In agreement with these statements there is a higher percentage of complete elimination of large litters consisting chiefly of females than of any other large litters. This elimination produces the high sex ratio for the litters of 4 and 5. The originally large litters in which the subsequent elimination is partial result in births of 1 and 2. Elimination being more severe on the female members causes the production of a higher sex ratio than occurs among individuals produced in litters of 3. Litters of 3 have the lowest sex ratio and approach nearest an expected condition, having suffered little or no prenatal mortality. This explanation is supported by a study of more than 100 litters with early partial absorptions which gave the high sex ratio of 123.37.—*George N. Papanicolaou.*

265. Pearson, Karl. **On the probable errors of frequency constants.** Biometrika 13: 113–132. 1920.—This editorial treats of the probable errors of constants supposed to be determined by a knowledge of the ranges in which certain proportions of the frequency lie. Formulae are derived for the standard deviations and correlations of the errors in any lengths measured along the x-axis as determined by the frequency of the corresponding ranges. Correlations of errors are calculated for various combinations of median, quartile, and decile when determined from grades and from moments. These are compared to show the relative errors of each method. The best method to determine the median and quartile divisions from ranks is indicated. Similar formulae are presented for the cases where the data are grouped into broad categories.—*John W. Gowen.*

266. Pearson, Karl. **The fundamental problem of practical statistics.** Biometrika 13: 1–16. *2 diagrams.* 1920.—The fundamental problem of statistics is, "An 'event' has occurred p times out of $p + q = n$ trials, where we have no *a priori* knowledge of the frequency of the event in the total population of occurrences. What is the probability of its occurring r times in a further $r + s = m$ trials."—Prefacing his remarks with the interesting historical background, the author shows that it is sufficient to assume any continuous distribution in order to reach Bayes's theorem, the fundamental basis of statistics.—He then proceeds to expand and develop Bayes's theorem showing that the Gaussian is applicable only under the special condition that n, p, q, and m are large. Under other conditions the skew frequency curves of types I or III give better results. Attention is called to the problem: Can the incomplete β function be expressed even approximately in terms of a limited number of incomplete Γ functions?—*John W. Gowen.*

267. PÉZARD, ALBERT. **Facteur modificateur de la croissance normale et la loi de compensation. [The modifying factor of the law of normal increase and the law of compensation.]** Compt. Rend. Acad. Sci. Paris **169**: 997–1000. 1919.—Pullets were found by HOUSSAY and the author to experience an interruption in growth some weeks prior to commencement of laying, the growth curve dipping downward, but subsequently rising to same level as if no such interruption had occurred. Author found, in 3 individuals tested, that growth was uninterrupted if ovariectomy was performed some time before the depression of the growth curve would normally have occurred.—*F. B. Sumner.*

268. PLATE, L. [German rev. of: ADAMETZ, L. **Studien über die Mendelsche Vererbung der wichtigsten Rassenmerkmale der Karakulschafe bei Reinzucht und Kreuzung mit Rambouillets. (Studies on the Mendelian characters of the Karakul sheep in pure breeding and in crosses with Rambouillets.)** *258 p., 16 pl.* Borntraeger: Berlin, 1917.] Arch. Rassen- u. Gesellschaftsbiol. **13**: 306–309. 1921.

269. RAGIONIERI, A. **Brassica crosses.** Gard. Chron. **68**: 60. 1920.—Author describes hybrids resulting from crosses between Chinese cabbage, Pe-tsai, and other Brassicas. The work was done at Castello, Italy. It is pointed out that Pe-tsai has good qualities which the plant breeder should not overlook. It grows rapidly, produces many tender leaves in large firm heads, and is of good flavor. In a number of the crosses of this with other Brassicas, no fertile seed resulted. Where good seeds were obtained, the F_1 plants showed great vigor. F_1 plants from crosses with the white turnip (*B. rapa*) were vigorous and without sign of a bulb. The tendencies to produce a bulb and an entire leaf were both recessive, and both characters appeared in F_2 in the Mendelian ratio. The bulbs in the 2nd generation showed a great variety of shapes. It was demonstrated that there is a great sexual affinity between *B. rapa* and *B. chinensis* var. Pe-tsai, and a very weak one between the latter and *B. oleracea.*—*A. C. Fraser.*

270. RASMUSON, HANS. **Die Hauptergebnisse von einigen genetischen Versuchen mit verschiedenen Formen von Tropaeolum, Clarkia und Impatiens. [The chief results of some genetical studies with different forms of Tropaeolum, Clarkia, and Impatiens.]** Hereditas **1**: 270–276. 1920.—A preliminary paper without data. Dark green color of leaves in *Tropaeolum majus* is determined by 2 factors. If either is recessive, color is probably green. Green color is dominant to yellow-green and both to variegated. Variegation in flowers is dominant to self color and dark color to light. Investigations were made of the behavior of purple, dark yellow, light yellow, and yellow variegated color in *Tropaeolum*; purple, purplish-red, lachs-red, and white color in *Clarkia elegans*; purple, purplish-red, white, and purple with white edge in *Clarkia pulchella*; blue, blue-red, red, pink, white, and white variegated in *Impatiens balsamina*. In *Tropaeolum* sharp monohybrid segregation was found between *nana* and normal types, but in *Impatiens* F_2 generation shows intermediate forms.—*M. Demerec.*

271. RENNER, O. [German rev. of: (1) FORSAITH, C. C. **Pollen sterility in relation to the geographical distribution of some Onagraceae.** Bot. Gaz. **62**: 466–487. 1916; and (2) COLE, R. D. **Imperfection of pollen and mutability in the genus Rosa.** Bot. Gaz. **63**: 110–123. 1917.] Zeitschr. Bot. **13**: 96–97. 1921.

272. STRAMPELLI, N. **Genealogia del frumento Carlotta Strampelli. [Genealogy of the grain Carlotta Strampelli.]** Atti R. Accad. Lincei. Roma Rend. Cl. Sci. Fis. Mat. e Nat. **27**: 131–135. *Fig. 1–4.* 1918.—"Carlotta Strampelli" wheat was originated by the author by selection from the progeny of a hybrid made in 1904 or 1905 between Rieti and Massy. The work was done in connection with extensive experiments made to produce high-yielding varieties adapted to climate and soil of central and northern Italy, resistant to rust, and with tall straw yet not liable to lodge. This selection, fulfilling the requirements, was named in 1914 and exhibited in Rome. Grown 4 years since then in various provinces of northern Italy it averaged about 5.5 quintals per hectare ($8\frac{1}{4}$ bushels per acre) more than other varieties.—At least 100,000 hectares were sown in 1918. Further increase in acreage sown to the variety is anticipated.—*C. E. Leighty.*

273. Thiem. [German rev. of: Haeckel, Ernst, Hugo Eisig, und Karl Hescheler. **Aus dem Leben und Wirken von Arnold Lang. (From the life and activities of Arnold Lang.)** G. Fischer: Jena, 1916.] Arch. Rassen- u. Gesellschaftsbiol. 13: 311. 1921.

274. Thomson, J. Arthur. [French rev. of: Doncaster, L. **An introduction to the study of cytology.** *15 × 23 cm., xiv + 280 p., 24 pl., 31 fig.* Cambridge Univ. Press: England, 1920.] Scientia 29: 233–234. 1921. [See also Bot. Absts. 7, Entries 722, 723, 842.]

275. Thomson, J. Arthur. [French rev. of: Morgan, T. H. **The physical basis of heredity.** *14 × 21 cm., 300 p., 117 fig.* J. B. Lippincott Co.: Philadelphia, 1919 (see Bot. Absts. 5, Entry 422; 7, Entry 938).] Scientia 29: 235–236. 1921.

276. Vieillard, P. **Note sur la sélection des riz par la constitution de lignées pures et sur les hybridations des riz. [Note on the selection of rice by the constitution of pure lines and on the hybridization of rice.]** Bull. Agric. Inst. Sci. Saigon 2: 11–15. 1920.—The methods of rice breeding in use at Tjikeumeuh near Buitenzorg (Java) are outlined. There are the usual pure line and hybridization methods commonly employed by those engaged in work on the self-fertilized cereals. The best of the pure lines have been increased and tested on a large scale, showing increased yield and other desirable characters. Selections from hybrids between "Skriviman Kati" and "Carolina" combine the good characters of the parents.—*C. E. Leighty.*

277. Vigiani, D. **Sulla selezione del frumento "Gentil Rosso." [Upon the selection of the wheat "Gentil Rosso."** Staz. Sperim. Agrarie Ital. 52: 5–13. 1919.—Report on breeding work done at Vegni Institute (Italy) on the wheat "Gentil Rosso," which is one of the important varieties in Tuscany and other parts of northern Italy. It has been determined by tests that this variety as commonly cultivated is less rust resistant and more liable to lodge, especially on rich land, than certain other varieties, but is productive, well developed, and early-maturing. Mass selection by the author resulted in increasing the yields over the variety as ordinarily grown. By means of pure-line breeding a strain has been developed which is considered superior to Gentil Rosso; it possesses all the good characters of the latter and none of its defects.—*C. E. Leighty.*

278. Vrijburg, B. **Fokkerij in Indië op meer wetenschappelijke basis. [Breeding in India on a more scientific basis.]** Mededeel. Ver. Bevord. Wetenschap. Teelt 12. *12 p., 2 pl.* 1921.—A general outline of breeding animals in Dutch East India is given.—*J. C. Th. Uphof.*

279. Waldron, L. R. **Inheritance of rust resistance in a family derived from a cross between durum and common wheat.** North Dakota Agric. Exp. Sta. Bull. 147. *24 p., 2 fig.* 1921.—From cross between Kubanka, an amber durum, and Power Fife, a hard red spring wheat of common type, certain plants of common type showed evidence of heterozygous condition relative to resistance toward stem rust (*Puccinia graminis*). Resistance (or susceptibility) was found to be intermediate and evidently due to more than 1 factor. Theoretical ratios based on 2-factor hypothesis agreed fairly well with actual results. Degree of resistance in certain segregates was as much or more pronounced as in resistant Kubanka parent. It is suggested that the heterozygote arose as result of simultaneous crossing over engaging 2 pairs of chromosomes. Resistant wheat has less technical value than either parent. —*L. R. Waldron.*

280. Wright, Sewall. **Correlation and causation.** Jour. Agric. Res. 20: 557–585. *16 fig.* Jan. 3, 1921.—Formulae are derived to measure the direct influence of one variable on another assuming that the direct influence of the given variable on the other can be measured by the standard deviation remaining in the effect after all other extraneous influences are eliminated. The expression $\sigma_{A.X}$ is used for the standard deviation of X due to A. Path

coefficient for the path from A to X is defined as the ratio of the standard deviation of X due to A divided by the total standard deviation of X.

$$p_{X.A} = \frac{\sigma_{X.A}}{\sigma_X}$$

The deviation of X directly caused by a unit deviation of A is

$$p_{X.A}\frac{\sigma_X}{\sigma_A} = \frac{\sigma_{X.A}}{\sigma_A}$$

The coefficient of determination of X by A, '$dX.A$' measures the fraction of complete determination for which factor A is directly responsible in a given system of factors.—These formulae are developed and illustrated for systems of independent causes, chains of causes, non-additive factors, non-linear relations, effects of common causes and systems of correlated causes. Their relation to multiple correlation is shown and general formulae are developed. Illustrative material is given on birth weight of guinea-pigs and on transpiration of plants.—*John W. Gowen.*

HORTICULTURE

J. H. GOURLEY, *Editor*

H. E. KNOWLTON, *Assistant Editor*

FRUITS AND GENERAL HORTICULTURE

(See also in this issue Entries 3, 12, 15, 30, 40, 47, 48, 50, 57, 69, 76, 78, 160, 221, 242, 255, 263, 339, 415, 425, 428, 430, 432, 434, 435, 444, 445, 446, 447, 465, 498, 524, 530, 552)

281. ANONYMOUS. [Rev. of: FLETCHER, S. W. **The strawberry in North America: history, origin, botany, and breeding.** *xiv + 234 p.* Macmillan Co.: New York, 1917.] Sci. Prog. [London] 14: 350. 1919.

282. BALLOU, F. H. **An orchard tragedy.** Monthly Bull. Ohio Agric. Exp. Sta. 6: 9–11. *Fig. 1–2.* 1921.—The article contains a discussion concerning tillage-cover-crop versus grass mulch practice in a hillside orchard as based upon tests upon hilly land in southern Ohio. In spite of careful cultural work the tillage-cover-crop section was in deplorable condition at the end of the test. Orchardists are adopting the mulching method because it results in equally generous fruit production, is less expensive, less difficult, and less dangerous.—*R. C. Thomas.*

283. BALLOU, F. H. **Ensee apple. An Ohio variety coming into prominence.** Monthly Bull. Ohio Agric. Exp. Sta. 6: 12–13. 1921.—Origin, similarity to the Rome Beauty, and merits of the Ensee apple are discussed.—*R. C. Thomas.*

284. BROWN, G. G. **The orchard-fertility problem.** Agric. Jour. [British Columbia] 5: 326, 354–355; 6: 20–21. 1921.—This report summarizes the results of orchard fertilizer experiments in other stations and compares them with results obtained by the Oregon Agricultural experiment station. Special emphasis is placed upon the use of alfalfa as a permanent shade crop and the effect of chemical manures, especially nitrate, on the growth of alfalfa. It emphasises the fact that legumes used as cover crops do not need added nitrogen, but rather are harmed by it; and that the growing of a legume, with possibly the addition of some acid phosphate and potash, may prove to be a good system for maintaining orchard fertility.—*A. F. Barss.*

285. H., T. A. [Rev. of: NEWLAND, H. OSMUN. **The planting, cultivation and expression of cocoanuts, kernels, cocoa, and edible vegetable oils and seeds of commerce. A practical handbook for planters, financiers, scientists and others.** *vi + 111 p., 11 pl.* Charles Griffin

and Co.: London, 1919.] Nature 106: 564. 1920.—The author has attempted too much in a small space and has not used it to best advantage.—*O. A. Stevens.*

286. Haseman, L. **Federal and state laws regulating the propagation and distribution of nursery stock.** Missouri Agric. Exp. Sta. Circ. 99. *24 p.* 1920.

287. Manuel, H. L. **"Yema" budding of the vine.** Agric. Gaz. New South Wales 32: 197–199. *3 fig.* 1921.—Budding is done when sap is flowing, but after period of greatest vigor of growth in order to produce a good callus. Buds are inserted 1 inch above level of soil; the bud is then covered well with soil and unmounded in spring when bud is ready to expand. An excellent callus forms during dormancy.—*L. R. Waldron.*

288. Morel, F. **Vignes de jardins et raisins de table.** [Garden vines and table grapes.] Rev. Hort. 93: 228. 1921.—Somewhat detailed descriptions are given of a number of seedings of cold- or disease-resistant grapes, and their general adaptability is discussed.—*E. J. Kraus.*

289. Stahl, J. H. **Recent development in small fruits.** Agric. Jour. [British Columbia] 6: 46–48. *2 fig.* 1921.—An address given at the annual meeting of Western Horticulturists, Vernon, British Columbia.—*J. W. Eastham.*

290. Thayer, Paul. **Characteristics of peach varieties.** Monthly Bull. Ohio Agric. Exp. Sta. 6: 3–8. 1921.—The relative time of picking the earlier varieties is fixed. Sixty-four varieties are discussed according to time of picking, flavor, size, color, and susceptibility to disease. Mayflower, Victor, Japan Blood Dwarf, Amsden, June Elberta, Early Rose, Greensboro, McNeil's Early, Admiral Dewey, Triumph, Waddell, Eureka, Champion, Smock, and Lemon Free are included in the list.—*R. C. Thomas.*

FLORICULTURE AND ORNAMENTAL HORTICULTURE

291. Anonymous. [Rev. of: Webster, A. D. **London trees: an account of the trees that succeed in London, with descriptive account of each species and notes on their comparative value and cultivation. With guide to where the finest London trees may be seen.** *8 vo, xii + 218 p., 32 pl.* Swarthmore Press: London.] Jour. Botany 59: 79–81. 1921.

292. Barnhart, J. H. **Jeffersonia diphylla.** Addisonia 5: 31, 32. *Pl. 176 (colored).* 1920.—A description and the botanical history of the plant, which is native of eastern U. S. A., is given. It is worthy of a place in the flower garden.—*T. J. Fitzpatrick.*

293. Boynton, Kenneth R. **Diplotaxis tenuifolia.** Addisonia 5: 3, 4. *Pl. 162 (colored).* 1920.—The wall-rocket, of the mustard family, a native of Europe, is of possible value in a flower garden because of the pleasing combination of the pale green foliage and light yellow flowers.—*T. J. Fitzpatrick.*

294. Boynton, Kenneth R. **Lilium henryi.** Addisonia 4: 65, 66. *Pl. 153 (colored).* 1919.—This lily is a native of central China, introduced into cultivation in 1898.—*T. J. Fitzpatrick.*

295. Boynton, Kenneth R. **Platycodon grandiflorum.** Addisonia 5: 13, 14. *Pl. 167 (colored).* 1920.—The Japanese bellflower, native of eastern Asia. It was introduced into the botanic garden at Vienna in 1775 and later into England. This perennial blooms during the summer and early fall and is a satisfactory permanent feature of the flower garden.—*T. J. Fitzpatrick.*

296. Boynton, Kenneth R. **Poinsettia heterophylla.** Addisonia 4: 77, 78. *Pl. 159 (colored).* 1919.—An annual ornamental herb, native of central and western U. S. A., introduced into cultivation in about 1885.—*T. J. Fitzpatrick.*

297. BRITTON, ELIZABETH G. **Adlumia fungosa.** Addisonia 5: 21, 22. *Pl. 171 (colored).* 1920.—The climbing fumitory is native of northeastern U. S. A. and Canada. It grows readily from seed and its ornamental flowers make it a valuable addition to the flower garden.—*T. J. Fitzpatrick.*

298. BRITTON, N. L. **Cephalanthus occidentalis.** Addisonia 5: 17, 18. *Pl. 169 (colored).* 1920.—This button-bush is of wide distribution in North America. It prefers wet soil or swamps and is not readily transplanted except when young, and then only to places similar to its native habitat.—*T. J. Fitzpatrick.*

299. BURKILL, I. H. **Annual report of the Director of Gardens for the year 1919.** *5 p.* Government Press: Singapore, 1921.—An administration report upon the Botanic Gardens, Singapore, and the Waterfall Gardens, Penang.—*I. H. Burkill.*

300. CLÉMENT, G. **Pyramides japonaises de chrysanthèmes.** [Japanese pyramidal chrysanthemums.] Rev. Hort. 93: 226–228. *Fig. 59.* 1921.—Methods of culture and a list of varieties best adapted to the training in this manner are given.—*E. J. Kraus.*

301. GLEASON, H. A. **Dracocephalum speciosum.** Addisonia 5: 27, 28. *Pl. 174 (colored).* 1920.—An ornamental mint, native of the northern Mississippi valley. It has been in cultivation since 1825.—*T. J. Fitzpatrick.*

302. GLEASON, H. A. **Vernonia crinita.** Addisonia 5: 11, 12. *Pl. 166 (colored).* 1920.—This ironweed is a native of the Ozark region of the U. S. A. It is too large and coarse for the small flower garden, but it may be naturalized to advantage in poor soils along walls, fences, in strips fronting scrub or dry woods, in open places and clearings. When established it maintains itself and does not become a pest.—*T. J. Fitzpatrick.*

303. LABROY, O. **Bougainvillea glabra et B. spectabilis. Notes du Bresil.** [Bougainvillea glabra and B. spectabilis. Notes from Brazil.] Rev. Hort. 93: 229–230. 1921.—Comparative descriptive notes and cultural suggestions are presented.—*E. J. Kraus.*

304. LESOURD, W. **Dahlias simples "Etoile Digoinaise."** [Single dahlias "Etoile Digoinaise."] Rev. Hort. 93: 232–233. *Fig. 60–61.* 1921.—The progenitor of this race of single dahlias was discovered by a Mr. L. Martin of Dijon 16 years ago. Since that time the present type has been selected and perfected in a number of colors. The flowers are star shaped, each petal has the edges of the outer two-thirds rolled in toward the center line, and since the back of the petal is of a different color than the face the effect is striking. It is well adapted for cutting and decorative purposes. There are a number of named varieties.—*E. J. Kraus.*

305. MARON, C. **Cattleya Rutilant.** Rev. Hort. 93: 230. *1 pl (colored).* 1921.—This variety, which produces intensely colored, medium sized flowers of a purple crimson color, is the result of a cross between *Cattleya Maroni* = (*C. velutina* × *C. aurea*) and *C. vigeriana* = (*C. aurea* × *C. labiata*). Of special interest is the fact that the flowers are of medium size, although three-fourths of the ancestry possessed large flowers.—*E. J. Kraus.*

306. MOUTTE, V. **La lavande.** [The lavender.] Rev. Eaux et Forêts 59: 11–18. 1921.—In the mountains of southeastern France lavender is a product of considerable importance to foresters. During recent years prices for essence of lavender have risen so greatly that artificial cultivation has been undertaken. Yields vary from 5 kg. of essence,—worth 150 francs per kg.,—in uncared for natural stands, to 24 kg. per hectare in highly cultivated areas. France's total estimated production in 1912 was 60,000 kg., with England as its only serious competitor. The growing and harvesting of lavender provides a considerable industry on lands otherwise unsuitable for cultivation, and it is an open question whether settlement in the mountains should not be encouraged by setting apart for this purpose certain of the better areas in the reforestation zones.—*S. T. Dana.*

307. Nash, George V. **Amygdalus davidiana.** Addisonia 5: 9, 10. *Pl. 165* (*colored*). 1920.—This peach was discovered in 1867 by Abbé David near Pekin, China, and later introduced by him into England. The ornamental flowers, appearing early, produce fruit of no value. The tree may prove of value for grafting stock.—*T. J. Fitzpatrick.*

308. Nash, George V. **Aphalandra nitens.** Addisonia 5: 23, 24. *Pl. 172* (*colored*). 1920.—A highly ornamental plant of the Acanthus family, native of Columbia. It was introduced into England in 1867. It is readily propagated by cuttings and thrives under greenhouse cultivation.—*T. J. Fitzpatrick.*

309. Nash, George V. **Benzoin aestivale.** Addisonia 5: 15, 16. *Pl. 168* (*colored*). 1920.—This spice-bush of the laurel family is a native of northeastern U. S. A. and Ontario. It is well adapted to the winter garden in low damp situations. The bright yellow flowers appear in early spring before the leaves and the bright red fruit in August and September.—*T. J. Fitzpatrick.*

310. Nash, George V. **Bryophyllum crenatum.** Addisonia 4: 63. *Pl. 152* (*colored*). 1919.—A native of central Madagascar and a succulent of easy culture.—*T. J. Fitzpatrick.*

311. Nash, George V. **Bulbophyllum grandiflorum.** Addisonia 4: 71, 72. *Pl. 156* (*colored*). 1919.—A large-flowered ornamental plant from New Guinea, recently receiving attention from culturists.—*T. J. Fitzpatrick.*

312. Nash, George V. **Corylopsis spicata.** Addisonia 5: 19, 20. *Pl. 170* (*colored*). 1920.—This shrub belongs to the witch-hazel family and is a native of southern Japan. The flowers and leaves are highly ornamental. Propagation may be effected by seed or by layering.—*T. J. Fitzpatrick.*

313. Nash, George V. **Crataegus calpodendron.** Addisonia 4: 67, 68. *Pl. 154* (*colored*). 1919.—This decorative pear thorn is a native of the eastern U. S. A. It is the *Crataegus tomentosa* of authors. As the red fruit persists until the following spring the plant is desirable as an ornamental shrub.—*T. J. Fitzpatrick.*

314. Nash, George V. **Elaeagnus multiflora.** Addisonia 4: 69, 70. *Pl. 155* (*colored*). 1919.—A much-branched shrub, native of China and Japan, with highly ornamental flowers and fruit.—*T. J. Fitzpatrick.*

315. Nash, George V. **Euonymus patens.** Addisonia 4: 75. *Pl. 158* (*colored*). 1919.—A shrub of decorative value, native of central China. It was introduced into the U. S. A. by George H. Hall in 1860.—*T. J. Fitzpatrick.*

316. Nash, George V. **Rosa "Dr. Van Fleet."** Addisonia 5: 7, 8. *Pl. 164* (*colored*). 1920.—This garden hybrid was produced in 1907 by pollinating with a hybrid between *Rosa wichuraiana* and *R. safrano.* This rose is a climber with shining leaves and flesh-pink flowers, and is much admired.—*T. J. Fitzpatrick.*

317. Nash, George V. **Viburnum dilatatum.** Addisonia 5: 1, 2. *Pl. 161* (*colored*). 1920.—A highly ornamental Viburnum, native of China and Japan, introduced into England about 1875, and since widely cultivated.—*T. J. Fitzpatrick.*

318. Proschowsky, R. **Au sujet de fruits comestibles de Chamaerops humilis et d'autres palmiers rustiques. [Concerning edible fruits of Chamaerops humilis and other hardy palms.]** Rev. Hort. 93: 230–231. 1921.—Several species have produced individuals having edible fruit of fair quality. These include *Chamaerops humilis* L.; *Phoenix canariensis* Hort. var *edulis*; and *Butia capitata* Beccari vars. *pulposa* and *pygmaea.* Other genera which should be examined for possible valuable selections are *Sabal, Erythea,* and *Brahea.*—*E. J. Kraus.*

319. Sands, W. N. **Bougainvillaeas.** Imp. Dept. Agric. West Indies Rept. Agric. Dept. St. Vincent 1918-19: 1–2. 1920.—The following varieties of *Bougainvillaea* are under cultivation: *B. glabra* (light magenta), *B. Sanderiana* (magenta), *B. spectabilis* var. *laterita* (terra-cotta), and *B.* var. "Mrs. Butt" (crimson). Artificial crosses of these lead to the opinion "that the magenta color in the bracts is dominant over crimson and terra-cotta reds as all hybrids raised in the W. I., so far as known, in which a magenta-bracted species or variety was one of the parents, have produced magenta-coloured bracts." The period between pollination of flowers and ripening of seed is about 30 days, and the seed, which resemble grains of wheat, germinate in about 10 days in partially sterilized soil. Seedlings are rather difficult to raise.—*J. S. Dash.*

320. Small, John K. **Hydrangea quercifolia.** Addisonia 5: 29, 30. *Pl. 175 (colored).* 1920.—An ornamental shrub, native of Georgia, Florida, Alabama, and Mississippi. It has been in cultivation for over a century in the U. S. A. and England. It is hardy at least 1000 miles north of its natural habitat.—*T. J. Fitzpatrick.*

321. Small, John K. **Leucothoe catesbaei.** Addisonia 4: 61, 62. *Pl. 151 (colored).* 1919.—An evergreen shrub, native of the southern Appalachians and adjacent highlands. This dog-laurel was early introduced into European gardens and is now widely cultivated as an ornamental shrub.—*T. J. Fitzpatrick.*

322. Small, John K. **Pieris floribunda.** Addisonia 5: 5, 6. *Pl. 163 (colored).* 1920.—A mountain fetter-bush, native of the southern Alleghanies, evergreen, highly ornamental, introduced into England in 1811. This shrub is easy of cultivation, grows rapidly, and is hardy far north of its natural range.—*T. J. Fitzpatrick.*

323. Watson, Elba E. **Corylus rostrata.** Addisonia 5: 25, 26. *Pl. 173 (colored).* 1920.—The beaked hazel-nut is a native of North America. It is of value because of the edible fruit, a small nut.—*T. J. Fitzpatrick.*

VEGETABLE CULTURE

324. Keil, J. B. **The gardener and the seedsman.** Monthly Bull. Ohio Agric. Exp. Sta. 6: 14–15. 1921.—A few essential considerations should be kept in mind when selecting vegetable seeds. A scale for rating seedsmen is given.—*R. C. Thomas.*

325. Rosa, J. T., Jr. **Sweet potato culture in Missouri.** Missouri Agric. Exp. Sta. Circ. 103. *12 p.* 1921.

326. Sosa, H. A. **La mandioca.** [Cassava.] Defensa Agric. [Uruguay] 1: 336–338. 1920.—The culture of cassava (*Manihot* sp.) is discussed.—*John A. Stevenson.*

HORTICULTURE PRODUCTS

327. Mach, F., und M. Fischler. **Die Zusammensetzung der Moste des Jahres 1919 in Baden.** [Musts of 1919 in Baden.] Zeitschr. Untersuch. Nahrungs- u. Genussmittel 40: 2–77. 1920.

328. Marcailhou d'Aymeric, A. **Analyse d'un vin de palmier ou "laghmi" du Sud-Tunisien.** [Analysis of a palm-wine or "laghmi" of southern Tunis.] Jour. Pharm. et Chimie 23: 272–273. 1921.—The wine has a sp. gr. of 1.0295 and contains 2 per cent of glycerin, 3 of gum, 7 of mineral matter, and, after allowing it to stand for about 1 week, 4.5 per cent of alcohol by weight. The wine is obtained by puncturing the palms of the oasis Gabès. It flows at the rate of 7–8 l. per day for 1 month. The puncture is closed with vegetable matter or dirt and the tree regains its normal appearance after 1 year. The wine is consumed by the natives very frequently immediately after collecting, even before fermentation has started.—*H. Engelhardt.*

329. Schellbach, H., und Fr. Bodinus. **Über Vanillin-Erzeugnisse. [Vanilla products.]** Zeitschr. Untersuch. Nahrungs- u. Genussmittel **40**: 34–37. 1920.

330. Stern, J. **Moste des Jahres 1919 aus den Weinbaugebieten der Nahe, des Glaus, des Rheintales unterhalb des Rheingaues, des Rheingaues, des Rheins, Mains und der Lahn. [Musts of 1919 in the Rhine valley, etc.]** Zeitschr. Untersuch. Nahrungs- u. Genussmittel **40**: 78–80. 1920.

MORPHOLOGY, ANATOMY AND HISTOLOGY OF VASCULAR PLANTS

E. W. Sinnott, *Editor*

(See also in this issue Entries 62, 175, 226, 380, 405, 453)

331. Balasubramanyam, M. **Variegation in certain cultivated plants.** Jour. Indian Bot. 1: 325–329. *Pl. 3.* 1920.—From an examination of leaf structure of cultivated ornamental plants with variegated leaves, the author concludes that there are 3 kinds of mesophyll in the leaf—palisade above, spongy below, and a distinct type between. Variegations are due to varying amounts or complete absence of chlorophyll in these 3 layers.—*Winfield Dudgeon.*

332. Buchholz, John T. **Polyembryony among Abietineae.** Bot. Gaz. **69**: 153–167. *15 fig.* 1920.—Not all Abietineae show a complete separation of the 4 primary embryos, as is characteristic of *Pinus*. The cleavages separating the 8 embryos are the free nuclear divisions of the proembryo. In *Picea* and other forms without cleavage polyembryony, cell divisions homologous with those in *Pinus* occur in the proembryo. The Abietineae embryos may be arranged in an intergrading series, with *Pinus* at one end and *Pseudotsuga* at the other, on the basis of the occurrence of cleavage polyembryony, rosette embryos, and the apical cell; the rosette embryos and their vestiges, the rosette cells, are gradually eliminated from *Pinus* to *Pseudotsuga*. Cleavage polyembryony, rosette embryos, and the apical cell mark a primitive type of embryo development. The embryo development of this group shows how the apical cell was lost in the evolution of the Abietineae. On the basis of embryogeny *Pseudotsuga* is unique and clearly entitled to generic rank.—*H. C. Cowles.*

333. Bugnon, P. **Causes du parcours transversal des faisceaux libéro-ligneux aux noeuds des Graminées. [The cause of the transverse course of the fibrovascular bundles at the nodes of grasses.]** Compt. Rend. Acad. Sci. Paris **171**: 673–675. *Fig. 1–3.* 1920.—A continuation of a study reported in a recent number of this journal (see Bot. Absts. 7, Entry 1060). The change in direction of the bundles at the nodes is attributed to lack of space or necessary tissue, and to the readiness with which transverse bundles can be formed at this level.—*C. H. Farr.*

334. Buscalioni, L. **Sui tricomi delle Felci con particolare riguardo alle Parafisi. [On the trichomes of ferns with particular regard to the paraphyses.]** Malpighia **28**: 545–554. 1920.—The article completes a study of the structure and function of fern paraphyses. The peculiar structure of these organs in different species of ferns suggests their use as a basis for comparison in systematic study. Paraphyses function as a means of protection to the sporangia, either mechanically or by reason of substances contained in them, and possibly serve also in regulating the dissemination of spores.—*Edith K. Cash.*

335. Church, A. H. **Elementary notes on the reproduction of angiosperms.** Bot. Mem. [Oxford] 5. *23 p.* 1919.—These are notes apparently used by the author in connection with some of his courses in botany.—*J. S. Cooley.*

336. Church, A. H. **Elementary notes on structural botany.** Bot. Mem. [Oxford] 4. *27 p.* 1919.—These are notes used by the author in connection with some of his courses in botany.—*J. S. Cooley.*

337. Church, A. H. **On the interpretation of phenomena of phyllotaxis.** Bot. Mem. [Oxford] 6. *58 p.* 1920.—Fibonacci phyllotaxis, as a phase of plant symmetry, is reduced to a condition of centric, axial growth-extension, combined with the outthrust in rythmic sequence of somatic protrusions in the transverse plane. To maintain the older inherent centric organization, the Fibonacci angle, 137° 30′ 28″, must be approximated every time, though the range of error may be considerable in the individual units. Actual measurements show that the general plan keeps very fairly adjusted in such divergent types as *Quinqueloculina*, *Cystoseira*, *Polytrichum*, and *Sempervivum*. Taking the general progression of Fibonacci phyllotaxis as the expression of an archaic method of initiating one lateral extension of the soma at a time, from a growth center or a differentiated growing point, the more fundamental and primary relations of living plasma, established once and for all, even in the plankton-phase, may remain predominant throughout all future phases of progression. All primary problems of stem and root, leaf and branch, members and tissues, cells and space-form, are to be sought far behind the comparatively modern and wholly secondary subaerial environment in which we find ourselves in the more familiar vegetation of the land.—*F. V. Rand.*

338. Merriman, Mabel L. **The receptacle of Achillea millefolium L.** Torreya 21: 21–24. *Fig. 1–5.* 1921.—The receptacle of *Achillea* is usually described as flat or convex, but specimens from the vicinity of New York City examined in October, 1919, showed a conical or oblong head. Further study in 1920 showed that while heads with flat receptacles bore an average of 12 flowers per head, the conical heads had from 23 to 27. The projection of the tubular beyond the ray-flowers, which is less than 1 mm. in the flat heads, was as much as 11 mm. in the conical forms. In some cases ray-flowers were interspersed with the tubular flowers on the elongated receptacle. Further experiments are suggested to determine whether in these elongated receptacles we have mutating characters or reversions. It is suggested that soil-content and seasonal conditions may have some influence.—*J. C. Nelson.*

339. Prayag, S. H. **Some observations on the inflorescence and flowers of the grape.** Agric. Jour. India 16: 60–64. *Pl. 8–9.* 1921.

340. St. John, Harold. **A freak sweet clover.** Rhodora 23: 25–26. 1921.—A description of a teratological specimen of *Melilotus alba* from Goldendale, Washington, characterized by an inflorescence with branching pedicels, which thus formed a panicle instead of the usual simple spike. In addition the pistil was foliaceous with 2 or 3 ovules borne on each of the slightly adnate edges.—*James P. Poole.*

341. Vuillemin, Paul. **Les aberrations de la symétrie florale.** [Various types of floral symmetry.] Compt. Rend. Acad. Sci. Paris 172: 35–39. 1921.—The author distinguishes 3 main types of floral form: Asymmetric, spiromorphic, and symmetric. The last named may be either actinomorphic or zygomorphic. *Actinomorphosis* refers to the substitution of the actinomorphic for the zygomorphic or the asymmetric; and *zygomorphosis* to the substitution of the zygomorphic for the actinomorphic or the asymmetric. Actinomorphosis is equivalent to some of the cases which have been called peloric, but not to all. The condition of zygomorphosis has not in the past been much studied. These types may vary in the plane of symmetry and in the configuration, position, or number of the floral parts. They may be exogenous or endogenous, the latter presenting either synanthy or paranthy. The paper includes a description of these types as they are found in *Tropaeolum majus.*—*C. H. Farr.*

342. Weatherwax, Paul. **Position of scutellum and homology of coleoptile in maize.** Bot. Gaz. 69: 179–182. *11 fig.* 1920.—The evidences derived from the structure and development of the maize embryo, including that of the ligule-less mutant, favor the idea that the coleoptile is the homologue of a foliage leaf, and that the cotyledon is a lateral organ.—*Paul Weatherwax.*

343. WISSELINGH, C. VAN. **Bijdragen tot de kennis van de zaadhuid. Tiende bijdrage. Over de zaadhuid van Reseda luteola L., Parnassia palustris L., Viola odorata L., Daphne mezereum L., Eleagnus edulis Siebold, Aucuba japonica Thunb. en Pirola rotundifolia L. [Contributions to a knowledge of the seed coat. Tenth contribution.]** Pharm. Weekbl. 58: 298–308, 326–342. *Pl. 2, fig. 22.* 1921.—In continuation of the author's previous studies [see Bot. Absts. 3, Entries 2453, 2809; 8, Entries 444, 445], the ovules of the above species are described, particular attention being paid to the structure and development of the integuments in the ovule and to the changes which they undergo as the ovule ripens into the seed. Cuticles and cork layers are especially studied.—*H. Engelhardt.*

MORPHOLOGY AND TAXONOMY OF ALGAE

E. N. TRANSEAU, *Editor*

(See in this issue Entry 373)

MORPHOLOGY AND TAXONOMY OF BRYOPHYTES

ALEXANDER W. EVANS, *Editor*

344. CHURCH, A. H. **Thallassiophyta and the subaerial transmigration.** Bot. Mem. [Oxford] 3. *95 p.* 1919.—See Bot. Absts. 7, Entry 2007.

345. DISMIER, G. **Notes sur les Fissidens serrulatus Brid. et Fissidens polyphyllus Wils [Notes on Fissidens serrulatus and F. polyphyllus.]** Rev. Bryologique 47: 54–56. 1920.—The geographical distribution and differential characters of *Fissidens serrulatus* and *F. polyphyllus* are discussed, emphasis being laid on certain anatomical features first pointed out by BOTTINI. So far as France is concerned the distribution of *F. serrulatus* is essentially Mediterranean, while that of *F. polyphyllus* is exclusively oceanic.—*A. W. Evans.*

346. HERZOG, TH. **Beiträge zur Bryogeographie Südosteuropas. [Contributions to the bryogeography of southeastern Europe.]** Krypt. Forsch. Bayer. Bot. Ges. München 4: 274–298. 1919.—The author participated with a German unit in military operations in the Balkans during the late war. As opportunity offered he made bryological observations and collections. The paper is divided into 2 parts, of which the 1st deals with Macedonia and the 2nd with the Transylvanian Alps of the Rumanian border. Lists of mosses and hepatics are given, together with a discussion of points of geographical and ecological interest. The Macedonian flora is primarily Mediterranean, that of the Rumanian mountains northern. As new species (both from the Cherna bend region of Macedonia) appear *Orthotrichum insidiosum* and *Mielichhoferia paradoxa*, the latter supposedly a relict of an ancient tropical or subtropical flora.—*A. LeRoy Andrews.*

347. POTIER DE LA VARDE, R. **Contribution à la flore bryologique du Kikouyou (Afrique orientale anglaise). [Contribution to the bryological flora of Kikuyu (British East Africa).]** Rev. Bryologigue 47: 49–54. *6 fig.* 1920.—This report is based on a collection made by J. SOUL in the vicinity of Nairobi, during the years 1912 and 1913. The species listed number 29, full data regarding localities being given under each. The following species are described as new and figured: *Anomobryum sulcatum* Thér. & P. de la V., *Bryum Soulii* Thér. & P. de la V., *Hylophila acuminata* Broth. & P. de la V., *Philonotis Soulii* P. de la V., and *Tortella Therioti* Broth. & P. de la V. Two new varieties are likewise described and the capsule of *Lindbergia patentifolia* Dixon, hitherto unknown, is figured.—*A. W. Evans.*

MORPHOLOGY AND TAXONOMY OF FUNGI, LICHENS, BACTERIA, AND MYXOMYCETES

H. M. Fitzpatrick, *Editor*

FUNGI

(See also in this issue Entries 151, 219, 492, 515, and those in the section Pathology)

348. Anonymous. **Auskunft über Speisepilze. [Information concerning edible fungi.]** Naturwiss. Zeitschr. Forst- u. Landw. 18: 278–279. 1920.—*Agaricus melleus*, well known in Germany as a serious enemy of soft woods, is described with reference to its life-history, morphology, edibility, etc. The edible qualities and food possibilities of the species are emphasized; a recipe for cooking is given.—*J. Roeser.*

349. Chipp, T. F. **A list of the fungi of the Malay Peninsula.** Gardens Bull. Straits Settlements 2: 311–418. 1920.—A complete list of the known fungi of the Peninsula with localities and hosts.—*I. H. Burkill.*

350. Church, A. H. **Elementary notes on the morphology of fungi.** Bot. Mem. [Oxford] 7. *29 p.* 1920.—These are notes apparently used by the author in connection with some of his courses in botany.—*J. S. Cooley.*

351. Clayley, Dorothy M. **Some observations on the life-history of Nectria galligena Bres.** Ann. Botany 35: 79–92. *Pl. 4, 5., fig. 1–25.* 1921.—A study of the morphology and cultural characters of a fungus isolated from an apple canker in Britain. The writer agrees with Weese that the Nectria which has been shown to form definite cankers on beech and other trees, and which has been discussed in literature under the name *Nectria ditissima* Tul., should be called *N. galligena* Bres. This fungus grew well and completed its life-history on a starch medium containing 1 per cent glycerine. All stages of the fungus,—microspores, macrospores, and perithecia,—develop normally on potato slants with 1 per cent glycerine, the latter being the only medium found on which the fungus developed perithecia. Pycnidia were found on bark but no mature pycnidia were seen in pure culture on artificial media. There is thus insufficient proof that pycnidia occur in the life-history of *N. galligena.*—Several ascogonia occur in the young perithecium; these degenerate and disappear before the formation of the asci. The ascogenous hyphae, from which the asci develop, arise *de novo* from cells at the base of the perithecium, the nuclei of which have the same characteristics as the nuclei of the ascogonia. The further development of the perithecium could not be followed.—*W. P. Fraser.*

352. Garrett, A. O. **Smuts and rusts of Utah — IV.** Mycologia 13: 101–110. 1921.—The paper includes discussions of 5 smuts and 45 rusts. *Hilaria Jamesii* is reported as a new host for *Ustilago Hypodytes* (Schlecht.) Fries, and *Lepidium perfoliatum* and culivated *Tropaeolum* as new hosts for *Puccinia subnitens* Dietel.—*H. R. Rosen.*

353. Gloyer, W. O. **Septoria leaf blight on the China aster.** [Abstract.] Phytopathology 11: 50–51. 1921.—A new disease of China aster (*Callistephus chinensis*) has been under observation in New York State since 1915. The leaves are spotted and finally killed by *Septoria Callistephi* n. sp.—*B. B. Higgins.*

354. Grove, W. B. **Mycological notes.—V.** Jour. Botany 59: 13–17. 1921.—The new combination *Boydia insculpta* (Oud.) Grove is made, it being shown that several species supposed by various authors to be distinct are really forms of the same species. A collection of undoubted *Puccinia Peucedani-parisiensis* (DC.) Lindr. from Britain is discussed. Notes are included on some fresh collections of *Phomopsis abietina* Grove. [See also Bot. Absts. 8, Entry 1294.]—*K. M. Wiegand.*

355. GUIART, J. **Considerations sur le mycetome, a propos d'un cas nouveau. [Considerations upon mycetomes with reference to a new case.]** Compt. Rend. Soc. Biol. Paris **83**: 277-278. 1920.—In a mycetome with white grains of the Aspergillus type a thin pigment layer was found which leads the author to conclude that this is a step in the transition from the white-grained to dark-grained type, and that accordingly the genera *Indiella* and *Madurella* are the same fungus in respectively the white-grain and dark-grain stage of development of the mycetome.—*E. A. Bessey.*

356. HORNE, ARTHUR S. **Diagnoses of fungi from spotted apples.** Jour. Botany **58**: 238-242. 1920.—The new genus Polyopeus is described, and a synopsis of the 4 species included is given. The genus is referred to the Hyphomycetes. The following new species and varieties are given: *Pleospora pomorum, Fuckelia botryoidea, Coniothyrium cydoniae* Brun. var. *mali, C. convolutum, Alternaria pomicola,* and *Sclerotium stellatum.*—*K. M. Wiegand.*

357. MURRILL, W. A. **A new bolete from Porto Rico.** Mycologia **13**: 60-61. 1921.—A species with pale, ellipsoidal spores is described as *Gyroporus Earlei* sp. nov.—*H. R. Rosen.*

358. MURRILL, W. A. **Light-colored resupinate polypores — III.** Mycologia **13**: 83-100. 1921.—A continuation of studies previously reported (see Bot. Absts. 8, Entry 466). In this paper rose-colored, lilac, red and purple species of *Poria* are described. Among the 26 species treated, the following are new: *Poria albirosea, P. subundata, P. subincarnata* (Peck), *P. Dodgei, P. Bracei,* and *P. subbadia.*—*H. R. Rosen.*

359. MURRILL, W. A. **Two species of Fuscoporia.** Mycologia **13**: 119. 1921.—Two new combinations are made based on dark-colored species previously included in *Poria.* They are *Fuscoporia tenerrima* (Berk. & Rav.), and *F. nebulosa* (Berk. & Curt.).—*H. R. Rosen.*

360. MURRILL, W. A. **A double mushroom.** Mycologia **13**: 119-122. *Fig. 1-3.* 1921.—A peculiar carpophore of *Agaricus campestris* is described in which there are 2 sets of gills as well as 2 stems. An appearance is given such as would exist if the caps of 2 mushrooms occurring side by side had entirely grown together and the stronger mushroom had lifted the other into the air. Comparable abnormalities in other gill-fungi are noted.—*H. R. Rosen.*

361. MURRILL, W. A. **The genus Tinctoporia.** Mycologia **13**: 122-123. 1921.—Three new combinations are made and the forms described. *Tinctoporia aurantiotingens* (Ellis & Macbr.) Murrill becomes *T. albocincta* (Cooke & Masse) comb. nov. on the basis of priority; the other new combinations are *T. graphica* (Bres.) based on *Poria graphica,* and *T. Fuligo* (Berk. & Br.), based on *Polyporus* (*Poria*) *Fuligo.*—*H. R. Rosen.*

362. PENNELL, FRANCIS W. **Index to American mycological literature.** Mycologia **13**: 126-128. 1921.

363. PUTTEMANS, A. **Gloeosporium Bombacis, n. sp.** Bull. Soc. Path. Veg. France **7**: 74-75. 1920.—The above fungus found on *Bomax* (*Pachyra*) *insignis* in the vicinity of Sao Paulo, Brazil, is described and its effect upon the host indicated. Bordeaux mixture is suggested as a control measure.—*C. L. Shear.*

364. REINKING, OTTO A. **Higher Basidiomycetes from the Philippines and their hosts I.** Philippine Jour. Sci. **15**: 479-490. 1919. [See also the 3 following entries.]

365. REINKING, OTTO A. **Higher Basidiomycetes from the Philippines and their hosts II.** Philippine Jour. Sci. **16**: 167-179. 1920.—Identification of the higher Basidiomycetes collected on Mount Maquiling and in the vicinity of Los Baños, Laguana Province, Luzon, in Mindanao, and in Sulu, with special reference to the host plants. [See also the preceding entry and the 2 following ones.]—*Albert. R. Sweetser.*

366. Reinking, Otto A. **Higher Basidiomycetes from the Philippines and their hosts III.** Philippine Jour. Sci. 16: 527–537. 1920. [See also the following entry and the 2 preceding ones.]

367. Reinking, Otto A. **Higher Basidiomycetes from the Philippines and their hosts IV.** Philippine Jour. Sci. 17: 363–374. 1920. [See also the 3 preceding entries.]

368. Seaver, Fred J. **Photographs and descriptions of cup-fungi—IX. North American species of Discina.** Mycologia 13: 67–71. *Pl. 4.* 1921.—The genus *Discina* is described and is interpreted as including large cup-fungi which have appendiculate spores. Four species are recognized and described, including *D. apiculata* (Cooke) Seaver, comb. nov., and *D. convoluta* Seaver, sp. nov.—*H. R. Rosen.*

369. Speare, A. T. **Massospora cicadina Peck—a fungus parasite of the periodical cicada.** Mycologia 13: 72–82. *Pl. 5–6.* 1921.—An extensive mycological study of the fungus, including both the conidial and resting spore stages. It is shown to belong to the Entomophthorales.—*H. R. Rosen.*

370. Stone, R. E. **Leaf scorch or mollisiose of strawberry.** [Abstract.] Phytopathology 11: 44. 1921.—A leaf disease of strawberries, serious in certain parts of Ontario, Canada, is due to *Marssonina Potentillae.* This fungus has been proved to be the conidial stage of *Mollisia Earliana* (E. & E.) Sacc.—*B. B. Higgins.*

371. Weiss, Harry B., and Erdman West. **Additional fungous insects and their hosts.** Proc. Biol. Soc. Washington [D. C.] 34: 59–62. 1921.—A list of insects found on various fungi is given.—*J. C. Gilman.*

372. Wormald, H. **On the occurrence in Britain of the ascigerous stage of a "brown-rot" fungus.** Ann. Botany 35: 125–135. *Pl. 6–7, fig. 1–9.* 1921.—The author describes a Sclerotinia found on mummified plums. Cultures from single ascospores gave conidia of the *Monilia cinerea* type. The spores agreed in size with those produced in culture from conidia taken from plums naturally infected with *M. cinerea.* Inoculations on plum flowers and fruit and cherry fruit with conidia obtained from cultures gave infection, while inoculations on apple flowers were not followed by invasion of the flowering spurs. Inoculations with a strain of *Monilia* isolated from a dead flowering spur of apple gave ready invasion of the flowering axis. The fungus is referred to *Sclerotinia cinerea* (Bon.) Schröter. The author also compares the brown-rot Sclerotinias and concludes that the *Monilia* strain obtained from North America is very similar to the gray *Monilia* common in Britain, but differs from the latter in its mode of growth in culture. Strains of *Monilia* from plum obtained in France and Holland proved similar in form to those in Britain. The American Sclerotinia appears, therefore, to be a distinct species, or at least a form culturally distinct from the European *Monilia cinerea* Bon. The Sclerotinias occurring on apricots and cherries in Europe show no essential morphological differences. Further study is needed to determine whether they are culturally or biologically distinct.—*W. P. Fraser.*

LICHENS

373. Church, A. H. **The lichen as transmigrant.** Jour. Botany 59: 7–13, 40–46. 1921.—In a previous paper (see Bot. Absts. 8, Entry 477) the author has suggested that lichens, or at least the fungous part, have arisen from algal ancestors. In the present paper it is pointed out that the intrusion of algal gonidia is not an unusual phenomenon, as the intrusion of photosynthetic as well as non-photosynthetic bodies occurs in a great many aquatic animals and plants. Many examples are given. It is the fungus which must be considered in phylogeny. Instead of flagellated zooids, the ancestors of the Ascomycetes probably had an open hymenium with asci discharging their spores by hydrostatic tension; the perithecium is more recent. Numerous small ascocarps, as in most lichens, is a more primitive condition than

a single large cup, as in *Peziza*. It is among the lichen-forming Ascomycetes that the most prominent suggestion of vestigial sexual organs occurs. Though curiously parallel, the Florideae and the lichens have no direct connection. The higher algae present a firm cortical layer resistant to intrusion and therefore the gonidia of lichens did not intrude during life in the open sea but probably in pools. It may be suggested that fungal hyphae represent the internal heterotropic portion of a seaweed with the cortical photosynthetic layers lost because of lack of oxygen. The complex soma of higher fungi simply represents the "skinned" soma of a complex alga, hence the striking similarities in reproduction. The algae of the lichen gonidia have penetrated later into the denuded algal soma; in this connection the attachment of unicellular algae to denuded seaweeds in pools is noted. The lack of sufficient oxygen for respiration at night in pools probably led to the death of the cortical layer, and probably to migration to subaerial ("splash") habitats. The first stage of migration to the land is shown by seaweeds living above the surface, but within the region of "splash." Lack of nitrogen and water keep the lichen thallus small after emergence. Resistance to drought is not characteristic of lichens, occurring also in some algae and fungi. Lichens are probably the oldest surviving race of land plants. It remains to show the course of evolution in the reproductive processes. The lichens and fungi are evidently polyphyletic.—*K. M. Wiegand.*

PALEOBOTANY AND EVOLUTIONARY HISTORY

E. W. Berry, *Editor*

(See also in this issue Entries 332, 339, 373, 512)

374. Arber, Agnes. **Water plants: a study of aquatic angiosperms.** *xvi + 436 p., 171 fig.* Cambridge Univ. Press. 31s. 6d. 1920.—The book contains much of interest from the standpoint of phylogeny and evolution. [See also Bot. Absts. 9, Entry 380.]—*E. W. Berry.*

375. Berry, Edward W. **A Potamogeton from the Upper Cretaceous.** Amer. Jour. Sci. 1: 420–423. *Fig. 1–3.* 1921.—A very characteristic Potamogeton, *P. perryi*, is described from the Ripley formation, late Upper Cretaceous, of western Tennessee.—*E. W. Berry.*

376. Carpentier, Alfred. **Découverte du genre Plinthiotheca Zeiller dans le Westphalien du nord de la France.** [**Discovery of the genus Plinthiotheca Zeiller in the Westphalian of northern France.**] Compt. Rend. Acad. Sci. Paris 172: 814–815. 1921.—This form, described originally from Heraclée, Asia Minor, is recorded from Pas-de-Calais. It is interpreted as a microsporophyll, elliptical in form and about 11 × 21 mm, in size, with one surface covered with microsporangia. It is considered to represent the microsporophyll of either *Linopteris obliqua* or *Neuropteris gigantea.*—*E. W. Berry.*

377. Chudeau, R., et P. H. Fritel. **Quelques bois silicifiés du Sahara.** [**Several silicified woods from the Sahara.**] Bull. Soc. Géol. France 20: 202–207. *Fig. 1.* 1920.—The general occurrence and varied age of sandstones with silicified wood throughout northern Africa are discussed. Three specimens of wood from the Sahara sandstone are described which are referred to the recently proposed form genus *Mesembryoxylon* Seward, and are considered as probably of Cretaceous age.—*E. W. Berry.*

378. Coleman, A. P. **Paleobotany and the earth's early history.** Amer. Jour. Sci. 1: 315–319. 1921.—A criticism, from the standpoint of physical geology, of Knowlton's thesis of uniform geologic climates under the influence of terrestrial heat.—*E. W. Berry.*

379. Depape, G. **Sur la présence du Juglans cinerea L. fossilis Bronn dans la flore plaisancienne de Saint-Marcel-d' Ardèche.** [**On the presence of Juglans cinerea L. in the Pliocene of Saint-Marcel-d' Ardèche.**] Compt. Rend. Acad. Sci. Paris 171: 865–866. 1920.

380. Guppy, H. B. **Evolution of water plants.** [Rev. of: Arber, Agnes. **Water plants: a study of aquatic angiosperms.** *xvi + 436 p.* University Press: Cambridge, 1920 (see Bot. Absts. 9, Entry 374).] Nature 106: 462–463. 1920.

381. Fritel, P. H. **Sur l'existence de l'Oeillette (Papaver somniferum var nigrum DC.) en Provence, a l'époque quaternaire. [On the existence of the poppy in the Pleistocene of Provence.]** Bull. Soc. Géol. France 20: 207–208. *Fig. 1.* 1920.—A well preserved capsule of a poppy from Aygalades, Bouches-du-Rhone, contained in a tuff of middle Pleistocene age is described and figured.—*E. W. Berry.*

382. Janet, Chas. **Considerations sur l'être vivant. Première partis. Résumé préliminaire de la constitution de l'orthobionte. [Considerations on the living being. Part one, Preliminary résumé of the organization of the orthobiont.]** *80 p., 1 pl.* Beauvais. 1920.—Study of ontogeny shows that all life springs from a single initial form—a phyto-zoo-flagellate, extraterrestrial in origin. Primordial assemblages of cells are called "merismes." Cells are of two kinds,—plano-plastids (flagellated) and aplano-plastids (non-flagellated), one form leading to the other. The primitive cell is eventually imperishable. A merisme consisting of a sporadic swarm with its derivative, the filament (of *Ulothrix*), and to transformations of that filament, is given the name "plethea." The first cell is a proplastid; cells in process of division are ontoplastids; products of division forming the merisme are teleplasts. Teleplasts are eventually imperishable (gonidia) and are apt to develop into new merismes. Planoplastids of the plethea may develop into a new merisme, the blastea, a spherical sheet formed of a single layer of cells. The type of this process is furnished by the ontogeny of the blastea of *Volvox*, stages of which are seen in the development of Algae, Bryophyta, Pteridophyta, and Anthophyta. The blastea of the phyto-zoo-flagellate may be considered as being represented by the blasteas of the phyto-flagellates, the Chlorophyceae, and the zoo-flagellates. Its proplastid is a planoplastid transformed by conditions into an aplanoplastid. There is a pletheoblasteen alternation in the primitive living form: (1) Alternation of plethea and blastea, resulting in plano-spores; (2) intercalary alternations of plethea and blastea, resulting in plano-spores; (3) male and female gametes; (4) parthenogenesis where there is failure of conjugation. Development that has its birth with the zygote disappears with the death of its merismes or terminates in a new zygote constituting a "holobiont." A line of merismes leading directly from an initial zygote to a first new zygote is an "orthobiont," which may be simple or double (with parthenogenetic alternation). The orthobiont is the essential element of phyletic lines. Phyto-flagellates and zoo-flagellates considered without regard to the divergences of the phyla differ merely in the mode of nutrition. The Volvocaceae are purely blastean chlorophytes in which occurs the differentiation into vegetative and sexual cells. In the unbranched Chlorophyceae, *Ulothrix* (a purely gonidial form) is directly derived from a chlorophyllian phyto-flagellate. The Chlorophyceae are pletheoblastean in nature. Departing from *Ulothrix* a differentiation of this state leads by way of the branched Chlorophyceae to the proto-archegoniate ancestor of the primitive eu-archegoniate, whence are directly derived the related groups, Bryophyta and Pteridophyta. The gymnosperms, or astigmates, are derived from a heterosporous pteridophyte of the extinct group of Cycadofilices. The angiosperms, or stigmates, are derived either from a pteridophyte of the Cycadofilices group related to that from which the gymnosperms originated, or from a primitive gymnosperm.—The primitive animal, the zoo-flagellate, or protozoan, is an orthobiont, simple or exceptionally double (parthenogenesis). The somatic animal, or metazoan, is derived from an ancestral zoo-flagellate with a simple orthobiont. The orthobiont of the insect, which is taken as a type, comprises an initial blastea plus alternation of plethea and blastea, plus blastea. The zygote develops into a blastea which in the very beginning differentiates into (1) soma and (2) a gonidium of the orthobiontic value of a spore. The germ is the product and direct descendant of the spore or primordial germinal cell which constitutes the single and precocious gonidium of the initial blastea.—*Winifred Goldring.*

383. Reynolds, S. H. **The lithological succession of the carboniferous limestone (Avonian) in the Avon Section at Clifton, Bristol.** [Abstract.] Ann. and Mag. Nat. Hist. 7: 255–256. 1921.—Among other things regarding the rocks of the Avon Section the author says that the 3 Modiola phases (calcareous-lagoon phases) of Kn, C_1–S_1, and the top of S_2 recognized by Dixon in Gower, are represented in the Avon Section, and that with them are constantly associated calcareous algae. The upper S_2 Zone is largely algal in origin, the Cotham-Marble-like layers consisting of *Mitcheldeania* or *Spongostroma.* The former is the most persistent calcareous alga, ranging from the base of the section to the top of S_2. *Ortonella* is characteristic of the K beds. *Solenopora* is also found here. *Spongiostroma* is the prevalent organism in many of the calcite-mudstones of C_2 and S. *Girvanella* is found in D_1, and *Aphralysia* in C_2 and S. The "Seminula-pisolite" structure of Vaughan proves to be of algal origin. [From author's abstract of a paper read at the meeting of the Geological Society.]—*H. H. Clum.*

384. Schuchert, C. **Evolution of geologic climates.** Amer. Jour. Sci. 1: 320–324. 1921.—Knowlton's conclusions that climate in the past was uniform and mild is criticized, and it is concluded that "throughout its history the earth has had temperature zones, varying from an intensity as marked as that of today to almost complete absence, so that the greater part of the earth had an almost uniformly mild climate, without winter."—*E. W. Berry.*

385. Stevens, Neil E. **Two petrified palms from interior North America.** Amer. Jour. Sci. 1: 431–443. *Fig. 1–16.* 1921.—*Palmoxylon cheyennense* is described in detail from the Pierre Cretaceous of South Dakota, and *Palmoxylon cannoni* from the lower part of the Denver formation (Eocene) of Colorado.—*E. W. Berry.*

386. T., H. H. [Rev. of: Scott, D. H. **Studies in fossil botany.** Vol. 1, *3rd ed., 8vo., 434 p., 190 fig.* A. & C. Black: London, 1920.] Jour. Botany 59: 53–55. 1921.

387. Twenhofel, W. H. **The Comanchean and Dakota strata of Kansas.** Amer. Jour. Sci. 49: 281–297. 1920.—The paper contains a number of references to the Dakota flora.—*T. J. Fitzpatrick.*

388. Wieland, G. R. **Paleobotany as viewed by two geologists.** Science 53: 437–439. 1921.—A note on geological climates.—*E. W. Berry.*

PATHOLOGY

G. H. Coons, *Editor*

C. W. Bennett, *Assistant Editor*

(See also in this issue Entries 5, 6, 15, 27, 30, 39, 40, 46, 47, 48, 50, 58, 82, 91, 139, 230, 235, 288, 349, 352, 353, 362, 363, 364, 365, 366, 367, 370, 529, 530)

PLANT DISEASE SURVEY; REPORT OF OCCURRENCE AND SEVERITY

389. Anonymous. **Report on the prevalence of some pests and diseases in the West Indies during 1918.** West Indian Bull. 18: 34–60. 1920.—A compilation from the reports of the principal agricultural officers in each of the colonies under the auspices of the Imperial Department of Agriculture. The degree of prevalence of the various diseases attacking local crops is given with suitable notes.—*J. S. Dash.*

390. Butler, E. J. **Report of the Imperial Mycologist.** Sci. Rept. Agric. Res. Inst. Pusa 1919–20: 58–67. 1920.—The report is a statement of progress in a number of lines of investigation. In "black band" of jute (*Corchorus olitorius* and *C. capsularis*), caused by *Diplodia Corchori* Syd., red-stemmed varieties are found to be slightly less susceptible than others; treatment of seed with fungicides is of little value, as the spores are not disseminated

along with seed to any appreciable extent.—Spraying was continued in orchards in Kumaon (outer Himalayas).—Identification of, and inoculation experiments in, *Fusarium*, *Helminthosporium*, *Acrothecium*, and *Rhizoctonia* diseases of cereals is in progress.—Rot in stored potatoes appears to be due to excessive temperature, and not primarily to fungous invasions.—A root rot of cotton (*Gossypium*) appears to be associated with some unknown soil conditions.—A fungous flora of India is in preparation. "The total number of recorded species is probably under 2000, which is certainly not one-fourth of those that exist."—The report closes with a program for work in 1920–21, and a list of publications for the year.—*Winfield Dudgeon.*

391. Nowell, W. **A disease of coco-nut.** Imp. Dept. Agric. West Indies Rept. Agric. Dept. St. Lucia 1918–19: 7. 1920.—Diseased specimens when received by the author were in bad condition; nevertheless a phycomycete resembling *Pythium* or *Phytophthora* was much in evidence on the central shoot and unexpanded leaflets. Because of parasitic habits of this group, this organism is suspected of having etiological relationships. Question arises whether this fungus is related to *Pythium palmivorum*, the bud-rot organism of the East recently suspected of causing coconut disease in Jamaica. Fructifications in the St. Lucia fungus are round or nearly so, and resemble the zoosporangia of *Pythium deBaryanum* more than do the pear-shaped Phytophthora-like sporangi of *Pythium palmivorum* and the Jamaica species. Further investigation is needed. Meanwhile, Bordeaux or Burgundy mixture, preferably with milk or resin soap to increase adhesion, is recommended for controlling the disease.—*J. S. Dash.*

392. Schmitz, Henry. **Observations on some common and important diseases of the rhododendron.** Phytopathology 10: 273–278. *11 pl.* 1920.—The important diseases of the rhododendron on the Pacific coast are summarized as follows: *Sporocybe azaleae*, *Melampsoropsis piperiana*, witches' brooms, white leaf, *Lophodermium rhododendri*, *Coccomyces dentatus*, *Coryneum rhododendri*, *Sphaerella rhododendri*, *Pestalozzia guepini*, and *Cryptostictis* sp. The symptoms of all these diseases are described and control measures are suggested for some.—*Ruth G. Bitterman.*

393. Schneider, Georg. **Der Kartoffelkrebs, eine eigenartige neue Kartoffelkrankheit in Deutschland.** [**The potato wart, a peculiar new potato disease in Germany.**] *8 p., 5 fig.* P. Parey: Berlin, 1918.—(Mitteil. K. Marine-Intendantur, Wilhelmshaven.)—A circular for the practical gardener and farmer giving the history and distribution of the potato wart disease in Germany, and an account of the life history of the pathogene. Emphasis is placed on the fact that this disease may become a serious factor in field potato culture although it is now restricted to home gardens in industrial centers where continuous potato culture is practiced and field sanitation unknown. Recommendations for preventing its further spread are given and the experience of England with the potato wart disease is cited as a warning to Germany.—The spread of initial infection is thought to be due to penetration of the deeper-lying tissues by swarm-spores liberated in the superficial tissue layers. The finding of sporangia in the base of an epidermal hair is reported.—*F. Weiss.*

394. Taylor, H. V. **The distribution of wart disease.** Jour. Ministry Agric. Great Britain 27: 733–738, 863–867. 1920.

395. Taylor, H. V. **The distribution of wart disease.** Jour. Ministry Agric. Great Britain 27: 946–953. 1921.

396. Voglino, P., e V. Bongini. **Malattie riscontrate nel mese di Dicembre.** [**Diseases observed in December.**] Pubbl. Mens. R. Osservatorio Fitopatol. Torino 1: 2–3. 1919.—The list of diseases includes apricot gummosis, *Polyporus igniarius* on cherry, *Botrytis cinerea* and *Gymnosporangium tremelloides* on apple, *Fusicladium pirinum* on pear, *Bacillus ampelopsorae* on grape, *Sclerotinia libertiana* on carrot, lettuce bacteriosis, and *Phytophthora infestans* on potato.—*Edith K. Cash.*

397. Voglino, P., e V. Bongini. **Malattie riscontrate nel mese di Gennaio. [Diseases observed in January.]** Pubbl. Mens. R. Osservatorio Fitopatol. Torino. 2: 2–3. 1919.—The following fungous and bacterial diseases are mentioned: *Clasterosporium carpophilum* on apricot, cherry, and almond, mulberry root-rot, *Septoria limonum* on lemon, *Botrytis cinerea* on apple, peach gummosis, *Septoria veronicicola* on *Veronica formosa*, *Phoma viticola* and *Baccillus ampelopsorae* on grape, *Sclerotinia libertiana* on carrot, *Polydesmus exitiosus* on cauliflower, *Septoria dianthi* on carnation, *Bremia lactucae* on lettuce, *Fusarium solani* and *Phytophthora infestans* on potato.—*Edith K. Cash.*

398. Weston, William H., Jr. **Another conidial Sclerospora of Philippine maize.** Jour. Agric. Res. 20: 669–684. *Pl. 76–78.* 1921.—A new species of *Sclerospora* (*S. spontanea*) has been found producing mildew of maize and rarely of sugarcane and bugang grass (*Saccharum officinarum*) in the Visayan Islands of Cebu, Bohol and Leyte. It is indistinguishable from *Sclerospora philippinensis*, previously described, in its virulence, host range, and in the symptoms produced on the various hosts in the field. However, extensive studies of fresh material show this species to be morphologically distinct from *S. philippinensis* and other oriental forms. Teosinte and *Miscanthus japonicus* have been infected by inoculation. The author is of the opinion that the oriental downy mildews are native on wild grasses.—*H. E. Thomas.*

THE PATHOGENE: BIOLOGY; INFECTION PHENOMENA; DISPERSAL

399. Rosen, H. R. **The behavior of telia of Puccinia graminis in the South.** Mycologia 13: 111–113. 1921.—Telia of *Puccinia graminis* as a rule are not abundant in the South, and those which are found are often undersized and fail to develop viable teliospores. The exception noted is the production of normal telia in the fall on *Elymus australis*. The teliospores on this host were successfully overwintered and infections were obtained on barberry.—*H. R. Rosen.*

400. Walkden, H. **The isolation of the organism causing crown gall on Chrysanthemum frutescens in Britain.** Ann. Botany 35: 137–138. 1921.—The writer describes an organism isolated from crown gall on *Chrysanthemum frutescens*. Inoculations on healthy plants reproduced the galls, and the organism was repeatedly re-isolated from the galls produced in this way. The characters of this organism proved identical with those of an authentic culture of *Bacterium tumefaciens*.—*W. P. Fraser.*

401. Wartenweiler, Alfred von. **Beiträge zur Systematik und Biologie einiger Plasmopara-Arten. [Contribution to the taxonomy and biology of some species of Plasmopara.]** Ann. Mycol. 16: 249–298. *3 pl., 12 fig.* 1918.—As a result of extensive morphological studies of conidia and conidiophores from *Plasmopara nivea* (Ung.) Schrœt., *P. pygmaea* (Ung.) Schrœt., and *P. densa* (Rabh.) Schrœt. from different hosts, *P. nivea* is separated into 6 forms: (a) On various umbellifers, (b) on *Anthriscus silvester* and *A. cerefolium*, (c) on *Conium maculatum*, (d) on *Laserpitium latifolium*, (e) on *Angelica refracta*, (f) on *Peucedanum palustre*. *Plasmopara pygmaea* is divided into 4 forms: (a) On *Anemone canadensis* and *A. caroliniana*, (b) on *Anemone raddeana* and *A. flaccida*, (c) on *Astragene alpina*, (d) on *Anemone hepatica*. In *P. densa* some variations in conidia and conidiophores are found but no division of the species is made. Graphs are given of a large number of spore measurements, mostly from 500 to 1000 from each of the different host plants. Mycelium of *P. nivea* found in the rhizomes of *Laserpitium latifolium* is described and illustrated. Whether this mycelium is in all cases perennial or not is connected with the question as to the first infection, which has not yet been determined. Other hosts showed no mycelium in rhizomes. The few inoculation experiments made were unsatisfactory and mostly negative. It is stated that if a generalization can be made from this study it is that the fungous forms from similar regions are in many, but by no means all, cases similar; but these similar forms do not occur on closely related hosts.—*C. L. Shear.*

THE HOST (RESISTANCE; SUSCEPTIBILITY; MORBID ANATOMY AND PHYSIOLOGY)

402. Kottur, G. L., and M. L. Patel. **Malformation of the cotton plant leading to sterility.** Agric. Jour. India 15: 640–643. *Pl. 43–45.* 1920.—Malformation of the cotton plants shows itself when 2–3 months old. The leaves are smaller and bunched, at first of an unusual dark green color changing to reddish and pinkish yellow as the malformation advances; the plants die without producing seed. The disease does not occur among American and Egyptian varieties. The Indian cottons, Surtee-Broch, Goghari and Wagod, are most affected. Light rainfall seems to favor the disorder and it is worse on alkali lands and where cotton is grown continuously without rotation. Where light soil is used the affection is less. The disease is not hereditary.—*J. J. Skinner.*

403. Lees, A. H. **Reversion of blackcurrants: A method of identification.** Jour. Ministry Agric. Great Britain 27: 1122–1127. *7 fig.* 1921.—Leaves on reverted plants produce fewer submain veins and the leaf edges are less serrated. The abnormality begins about the middle of May; the early leaves may be normal. Propagation from normal stock and the rogueing of diseased individuals are recommended as control measures.—*C. W. Bennett.*

404. Sundberg, Roberto. **Causas y sintomas de enfermedades en las plantas. [Causes and symptoms of plant diseases.]** Defensa Agric. [Uruguay] 1: 131–133, 160–163. 1920.—A very general account of the relation of heat, light, water, soil, and cultural conditions to health in plants.—*John A. Stevenson.*

405. Vincens, M. F. **Note sur les formations ligneuses anormales dans l'écorce de l'Hevea brasiliensis. [Note on abnormal woody formations in the bark of Hevea brasiliensis.]** Compt. Rend. Acad. Sci. Paris 171: 871–873. 1920.—Three types of abnormal woody formations are indicated by bark irregularities: (1) The healed wounds from bleeding, (2) small, somewhat pointed projections, of disputed origin, with a hard woody core, often independent of the normal wood or joined to it by a short slender strand, (3) plates made up of branched and interwoven strands of variable diameter (1 mm. to 1 cm.) and considerable extent. Sections show structure similar to secondary wood surrounding some cells which appear dead but on staining with Sudan III were shown to be laticiferous and to communicate with other cells of the same type. The strands are surrounded by generative tissue. Rutgers studying this condition in Java reported that the death of the central cells was caused by *Phytophthora Faberi.* Vincens' observations from Cochin China do not support this view. He fails to find mycelium necessarily associated with the production of these structures but always finds a bacterium and sometimes also a *Fusarium*, but thinks the latter negligible since no mycelium was observed. Many bacteria live in the latex.—*Eloise Gerry.*

DESCRIPTIVE PLANT PATHOLOGY

406. Anonymous. **El carbon volante del trigo. [Loose smut of wheat.]** Defensa Agric. [Uruguay] 1: 312–318. *5 fig.* 1920.—A description of the disease caused by *Ustilago tritici*, which has been very prevalent in Uruguay, is given.—*John A. Stevenson.*

407. Anonymous. **Enfermedades de las plantas producidas por hongos. [Plant diseases produced by fungi.]** Defensa Agric. [Uruguay] 1: 79–83. *7 fig.* 1920.—A popular account of fungi as to structure, spore production, and spore germination.—*John A. Stevenson.*

408. Anonymous. **Potato disease (blight [Phytophthora infestans]) in 1920.** Jour. Ministry Agric. Great Britain 27: 1146–1147. *1 fig.* 1921.

409. Anonymous. **Sugar cane disease.** South African Sugar Jour. 5: 201–203. 1921.—An account of the sugar cane diseases in Natal and Zululand is given. The diseases listed are as follows: A root disease caused by a soil fungus, *Himantia stellifera*, which has also been

observed on the "umthente" grass (*Imperata arundinacea*); two leaf spot diseases,—the ring spot caused by *Leptosphaeria sacchari*, and the eye spot caused by *Helminthosporium sacchari;* and 2 stalk diseases caused by *Melanconium sacchari*, the "rind disease" fungus, and *Cephalosporium sacchari*. *Colletotrichum falcatum* has not been observed here. *Schizophyllum commune* has been found in Zululand on old cane stalks lying on the ground, but never on standing cane. The fungus is common everywhere on old stumps and logs of various trees, and occurs also as a wound parasite of fruit trees. In addition to these diseases caused by fungi, there is a physiological trouble,—the occurrence in the internodes of strips of spongy tissue or cavities surrounded by spongy tissue. The cells of the spongy tissue are dead, filled with air, and no sucrose collects in them. Such spongy stalks are readily attacked by fungi.—*E. K. Tisdale.*

410. Anonymous. **Wither-tip and brown rot of plums.** Jour. Ministry Agric. Great Britain 27: 1142–1145. *6 fig.* 1921.

411. Arnaud, G. **Une maladie bactèriene du lierre (Hedera Helix L.). [A bacterial disease of Hedera Helix.]** Compt. Rend. Acad. Sci. Paris 171: 121–122. 1920.—A disease caused by *Bacterium hederae* n. sp., is found occurring on the leaves. It may be distinguished from that caused by *Phyllosticta* by the transparency of the leaf spots.—*C. H. Farr.*

412. Ashby, S. F. **Notes on two diseases of the coco-nut palm in Jamaica caused by fungi of the genus Phytophthora.** West Indian Bull. 18: 61–73. 1920.—Part 1 of the article deals with a bud rot caused by *Phytophthora palmivora*. The macroscopic and microscopic characters of the disease are given, as well as results of inoculations from pure cultures. Identification of the pathogene, its distribution, infection, spread, and treatment are fully dealt with. Comparisons are made with other types of bud rot.—Part II treats of a leaf-stalk rot caused by *P. parasitica*. Notes on the symptoms, etiology and control are recorded.—*J. S. Dash.*

413. Chen, Chunjen C. **[Some important cotton diseases.]** Ko-Hsueh [Science-Publ. Chinese Sci. Soc.] 6: 168–175. 1921. [Text in Chinese.]—The cause, symptoms, means of transmission, and control of the following important cotton diseases are reviewed: Angular leaf spot, anthracnose, wilt, root-knot, potash-hunger, damping-off, root rot, Diplodia boll rot, shedding of bolls and squares, leaf spot, and club-leaf.—*Chunjen C. Chen.*

414. Dufrenoy, Jean. **Sur des tumeurs bactèriennes expérimentales de l'Epicea. [Bacterial tumors experimentally produced on Picea.]** Compt. Rend. Acad. Sci. Paris 171: 874–876. *Fig. 1–3.* 1920.—Cambium of the canker may be used to infect a healthy tree. Bacteria found in the cankers are described but are not named.—*C. H. Farr.*

415. Giaccone, V. **Los principales enemigos del viñedo. [The principal enemies of the vineyard.]** Defensa Agric. [Uruguay] 1: 67–70. 1920.—A popular account of the more important parasitic and non-parasitic diseases of the grape, including *Oidium*, *Plasmopara*, "blackrot," chlorosis, and root rot.—*John A. Stevenson.*

416. Girardi, José. **La chlorosis de las plantas. [Chlorosis of plants.]** Defensa Agric. [Uruguay] 1: 300–302. 1920.

417. Girardi, José. **Tumor bacteriano del duraznero. [Bacterial tumor of the peach.]** Defensa Agric. [Uruguay] 1: 279–281. *1 fig.* 1920.—A gall forming disease of the peach said to be distinct from crown gall (*Bacterium tumefaciens*) is described and attributed to *Bacterium persicae*, n. sp.—*John A. Stevenson.*

418. Graebner, Paul. **Lehrbuch der nichtparasitären Pflanzenkrankheiten. [Textbook of non-parasitic plant diseases.]** *vii + 333 p., 245 fig.* Paul Parey: Berlin, 1920.—In a concise textbook written from the standpoint of both the gardener and botanist, the writer seeks to cover the diseases and weakened conditions of plants brought about by non-parasitic

agencies in which parasites are at least secondary. For the most part the book aims to give a short presentation of the material for teaching purposes, rather than a fuller presentation, such as given by Sorauers' Handbuch der Pflanzenkrankheiten, I. The book, however, uses the plates from the Sorauer text and the arrangement of the material is similar. Following a general introduction dealing briefly with the history of the subject, the concept of disease, and the causes of plant disease, the relation of climate and geographical location and plant disease is outlined. In the main body of the work the form of presentation is largely descriptive, and the material is presented under 6 topics: (1) Unfavorable soil; (2) air conditions (moisture, dryness, wind); (3) heat and light; (4) wounds; (5) injurious gases and liquids; (6) enzymatic diseases (panachure, mosaic, gum and resin flow). The book is indexed and some literature references are made.—*G. H. Coons.*

419. Hudig, J., en C. Meyer. **De Veenkoloniale haverziekte III.** [**The marsh-colony disease of oats, III.**] Verslag. Landbouk. Onderzoek. Rijkslandbouwproefsta. **23**: 1–39. *Fig. 1–15.* 1919.—In pure quartz sand free from organic substances, oats may be grown in a mixture of salt solutions which are basic, though the plants should not have too long a period of growth. An addition of roots of oats, stalks of oats, and cotton batting to the sand in quantities of 0.75–2 per cent causes the disease, independent of early or late sowing or cold or warm weather. The presence of a basic fertilizer is necessary. Under the same conditions extracts of roots of oats have the same effect as added pieces of roots. Leaves of oats added in the same quantities have a favorable effect upon the plants. Sand cultures to which acid salts or nitrites are added never develop the disease. Manganese sulphate appears best suited to combat the disease. [See also following entry.]—*J. C. Th. Uphof.*

420. Hudig, J., en C. Meyer. **De Veenkoloniale haverziekte IV.** [**The marsh-colony disease of oats, IV.**] Verslag. Landbouwk. Onderzoek. Rijkslandbouwproefsta. **23**: 128–158. *Fig. 1–8.* 1919.—The disease, which may become very dangerous, appears as a striped chlorosis and is caused by alkali in the soil solution. A decoction of decomposing cellulose in sand containing alkali may cause the disease; potato starch has the same effect. Material containing cellulose is harmless if the environment is acid; also if manganese sulphate or sulphur is applied. Sulphur flour is oxidized to sulphuric acid in aerobic sand cultures. [See also preceding entry.]—*J. C. Th. Uphof.*

421. Jagger, Ivan C. **A transmissible mosaic disease of lettuce.** Jour. Agric. Res. **20**: 737–739. *Pl. 87.* 1921.—The disease occurs in Florida, North Carolina, and New York.—Romaine lettuce (Paris White Cos) and head lettuce (Big Boston) are affected. Typical mottling and wrinkling occur. All variations are found from very slight mottling with no apparent injury to pronounced mottling and very evident dwarfing of plants. Transmission experiments with the aphid, *Myzus persicae,* were successful.—*D. Reddick.*

422. Nowell, W. **The red ring disease of coco-nut palms.** West Indian Bull. **18**: 73–76. 1920.—A more complete report is given on infection experiments carried out in Grenada, West Indies, which supplements earlier notes on the same subject (see Bot. Absts. 4, 1327). The results support the idea that infection occurs in the leaf bases, and may frequently take place by way of the small cracks formed by the bending outwards of the leaf as it matures. This would render untenable a previous hypothesis that infection takes place at an early age, the effects manifesting themselves only on the maturing of the tree.—*J. S. Dash.*

423. Oortwijn Botjes, J. G. **De bladrolziekte van de aardappelplant.** [**Leafroll disease of the potato plant.**] *136 p. 8 pl.* Wageningen, 1920.—The primary symptoms can easily be mistaken for those of other diseases, but the secondary ones are definite and in this period occurs the rolling up of the leaves. On infested plants grown from healthy tubers, symptoms often can not be noticed during the 1st period of growth. The necrosis of the phloem is typical and this is accompanied by a retardation in the transfer of starch. External symptoms can be observed about 10–30 days after the tubers start growth. Leafroll disease is contagious;

the cause is unknown. Transfer of the infection takes place through agency of plant lice. Artificial inoculations have failed; soil infection seems to be excluded. Some strains are resistant, others are not; selection of resistant plants is advisable.—*J. C. Th. Uphof.*

424. Yeh, Yuen Ting. [Translation of: Cook, O. F. **A disorder of cotton plants in China: Club-leaf or Cyrtosis.** Jour. Heredity **11**: 99–110. 1920 (see Bot. Absts. 8, Entry 532).] Hua-Shang-Sha-Chang-Lien-Ho-Hui-Ki-Kan [China Cotton Jour.] 2[2]: 235–240. *Fig. 1–10.* 1921.

ERADICATION AND CONTROL METHODS

425. Anonymous. **Calendario para los tratamientos preventivos y curativos de las plantas. [Calendar of preventive treatments and remedies for plant diseases.]** Defensa Agric. [Uruguay] **1**: 61–64. 1920.—Treatments recommended for pests and fungous diseases of pear, apple, plum, and other fruits are outlined.—*John A. Stevenson.*

426. Anonymous. **Cura de las semillas de triga. [Treatment of seed wheat.]** Defensa Agric. [Uruguay] **1**: 115–119. *6 fig.* 1920.—The paper outlines copper sulphate and formalin treatments of seed wheat as smut preventives.—*John A. Stevenson.*

427. Anonymous. **The inspection of potato crops during 1920.** Jour. Ministry Agric. Great Britain **27**: 954–957. 1921.

428. Anonymous. **E mildiou o blanco de los zapallos. [Cucumber mildew.]** Defensa Agric. [Uruguay] **1**: 12–13. 1920.—Bordeaux treatment is advised for powdery mildew (*Oidium* sp.) of cucumbers.—*John A. Stevenson.*

429. Berg, R. C. van den, Rzn. **Ontsmettingsproef tegen steenbrand by tarwe. [Treating wheat against stinking smut.]** Tijdschr. Plantenz. **27**: 17–19. 1921.—In this experiment 125 l. of wheat, smutted artificially by mixing with 100 cc. of smut kernels (*Tilletia tritici*), were treated in part with copper sulphate and in part with Uspulun. In the 1st case the seed was sprinkled thoroughly with a solution of copper sulphate (100 gm. of copper sulphate dissolved in 1.25 l. of water for every 50 l. of grain). In the 2nd case it was sprinkled with Uspulun (20 gm. of Uspulun dissolved in 4 l. of water for every 50 l. of grain). In both cases the seed was thoroughly mixed during the sprinkling and was planted immediately after treatment. The following numbers give the results in the various plats, in terms of smutted heads in 780 heads: Untreated—52, 69; Uspulun—11, 9, 28; copper sulphate 1, 0, 0.—*D. Atanasoff.*

430. Birmingham, W. A. **A treatment for tomato wilt on trial.** Agric. Gaz. New South Wales **32**: 212. 1921.—A popular treatment for tomato wilt was tried with negative results.—*L. R. Waldron.*

431. Bovell, J. R. **Plant inspection and fumigation.** Rept. Dept. Agric. Barbados **1917-1918**: 31–32. 1920.—When the Bourbon cane succumbed to the attacks of *Colletotrichum falcatum* it was replaced by the White Transparent, which often grew in the same hole as badly attacked Bourbon canes, but remained resistant. It now appears, according to the author, that after many years of cultivation in the Colony, the White Transparent has lost its immunity to the disease in question. *Cercospora vaginae* and *Marasmius sacchari* were also in evidence and will continue so long as planters do not select cane-planting material more carefully. The green scale, *Coccus viridis*, was successfully controlled by spraying with spores of *Cephalosporium lecanii* suspended in water.—*J. S. Dash.*

432. Eastham, J. W., and E. C. Hunt. **Spraying for apple scab in the Kootenays.** Agric. Jour. [British Columbia] **6**: 38–39. 1921.—Results are recorded of comparative tests with lime-sulphur and the modified Bordeaux mixture with soluble sulphur as calyx spray recom-

mended in Nova Scotia. The Bordeaux gave satisfactory results in scab control and increased yield in the case of McIntosh and Northern Spy, especially the former. 10 per cent russeting occurred in McIntosh; the amount was negligible in Northern Spy. Foliage was better throughout the season on the Bordeaux plot. Sulphur dust, with arsenate of lead added for one application only, gave very poor results, the percentage of scab being as high as 89 on McIntosh. Sander's "Copper dust" gave good results under similar conditions.—*J. W. Eastham.*

433. Fantini, Nicolás. **La antracnosis y medios de curación.** [Anthracnose and its cure.] Defensa Agric. [Uruguay] 1: 179–180. 1920.—Popular discussion of grape anthracnose (*Gloeosporium ampelophagum*).—*John A. Stevenson.*

434. Fromme, F. D., G. S. Ralston, and J. F. Eheart. **Dusting experiments in peach and apple orchards in 1920.** Virginia Agric. Exp. Sta. Bull. 224. *12 p., 1 fig.* 1921.—A sulphur dusting mixture (80 parts sulphur, 10 parts hydrated lime, 10 parts arsenate of lead) gave very satisfactory control of peach scab, but the data on brown-rot were insufficient to furnish a basis for conclusions. Severe cracking of peach fruits resulted from excessive applications of the dust. Three dusts were used on apples: Sulphur dust, copper-lime dust, and Bordeaux dust. The 1st proved much more effective in the control of apple scab than either of the other 2 mixtures, and gave results almost as good as those obtained on the spray plots. Neither of the copper dusts proved at all effective in the control of bitter-rot on apples. A comparison of the results of the season's tests with those of previous years in Virginia is included.—*F. D. Fromme.*

435. Giaccone, V. **Como curar el duraznero en primavera y principio de verano.** [Treatment of the peach in spring and early summer.] Defensa Agric. [Uruguay] 1: 293–294. *2 fig.* 1920.—Treatment for *Exoascus deformans* and *Aphis persicae* is given.—*John A. Stevenson.*

436. Hardenburg, E. V. **Seed potato problems.** Potato Mag. 3^{10}: 22–23, 25, 30. 1921.—Variety tests require several strains from a variety group that has been found suitable locally. Careful attention may prevent degeneration. Seed certification helps to supply good seed because of its effect in controlling leafroll and mosaic. For 5 or more acres, an isolated seed plot is desirable. Usually not enough seed per acre is planted.—*Donald Folsom.*

437. Martin, William H. **A comparison of inoculated and uninoculated sulfur for the control of potato scab.** Soil Sci. 11: 75–85. *Pl. 1, fig. 1–3.* 1921.—Uninoculated commercial flour sulphur and commercial flour sulphur inoculated with 1 per cent of soil from a compost heap known to contain sulphur oxidizing organisms, was added to the soil just before planting potatoes in scab infested land. Hydrogen-ion exponents of soil samples taken from plots treated with inoculated sulphur were lower than of those treated with uninoculated sulphur. In most instances the increase in acidity was accompanied by a corresponding decrease in the number of unsalable scabby potatoes. [See also following entry.]—*W. J. Robbins.*

438. Martin, William H. **Relation of sulfur to control of potato scab.** Potato Mag. 3^{9}: 5–6, 22–23. *4 fig.* 1921. [See also preceding entry.]

439. N [orris], F. de la M. **Notes on the field-treatment of mouldy rot.** Agric. Bull. Federated Malay States 8: 113–116. 1921.—Mouldy rot is a disease of the tapped surface of the Para rubber tree, *Hevea brasiliensis*, one of the causes of which is a fungus assigned to the genus *Sphaeronema*. Cleanliness of tapping knives and disinfectant paints appear to check it.—*I. H. Burkill.*

440. Porter, R. H. **A two-minute treatment of seed potatoes.** Potato Mag. 3^{9}: 8–9. *2 fig. 1921.*

441. Salmon, E. S., and H. Wormald. **Prevention of "bunt" in wheat.** Jour. Ministry Agric. Great Britain **27**: 1013–1021. 1921.—Field tests were conducted during 1919 and 1920 on the value of copper sulphate and formalin seed treatments for the control of "bunt," *Tilletia tritici*, in wheat. The chief solutions used were copper sulphate 1 and 2½ per cent and formalin 1:320 and 1:240. These were sprinkled over the grain at the rate of 1 gallon to 2 bushels of grain, after which the copper sulphate treated grain was spread out at once to dry and the formalin treated grain was placed in a heap and covered with sacks for 4 hours, and finally spread out to dry.—The percentage of germination of the treated grain was only slightly reduced when the above treatments were used, but in a few preliminary tests with stronger solutions of copper sulphate, up to 5 per cent, the injury to germination was considerable. Therefore the practice which is common in Britain of using 10 per cent copper sulphate solution for treatment should be discouraged.—The formalin treatments gave complete control of "bunt" whereas the copper sulphate treatments were much less effective. Treatment with formalin 1:320 is recommended.—*M. B. McKay.*

442. Sosa, H. A. **Como evitar las enfermedades en las plantas. [How to avoid plant diseases.]** Defensa Agric. [Uruguay] **1**: 141–144. 1920.

443. Sullivan, K. C. **Plant inspection in Missouri.** Missouri Agric. Exp. Sta. Circ. 101. *16 p.* 1920.

444. Thomas, R. C. **Brown rot of peaches and its control.** Monthly Bull. Ohio Agric. Exp. Sta. **6**: 26–30. 1921.—Brown rot attacks plums and peaches, beginning in May and continuing through the summer. Control measures are considered under 2 heads, (1) sanitary precautions and (2) protective sprays. Lime-sulphur-glue spray was found to be very satisfactory for the control of brown rot and other mid-season peach diseases. At the close of the article a spray calendar for peach is given.—*R. C. Thomas.*

445. Trujillo, Augustin. **El Oidium y modo de combatirlo. [Oidium and the method of combating it.]** Defensa Agric. [Uruguay] **1**: 120–121. 1920.—Powdery mildew of the grape.—*John A. Stevenson.*

446. Trujillo, Augustin. **El Oidium y modo de combatirlo. [Treatment for Oidium.]** Defensa Agric. [Uruguay] **1**: 141. 1920.—The writer advocates the use of sulphur or sulphur compounds for powdery mildew (*Oidium*) of the grape.—*John A. Stevenson.*

447. Vermorel, V., et E. Dantony. **La defense de nos jardins contre les insectes et les parasites.** *13 × 22 cm., 232 p., 12 pl (colored).* Progres Agricole et Viticole: Villefranche-Montpellier, 1919 (?).—Small handbook for French growers, containing descriptions and illustrations of the principal insect pests and fungous diseases, with chapters on disease and insect control.—*D. Reddick.*

448. Voglino, P., e V. Bongini. **Consigli pratici per il mese di Febbraio. [Control measures recommended for the month of February.]** Pubbl. Mens. R. Osservatorio Fitopatol. Torino 1919^2: 1. 1919.—The brown spot of cherry caused by *Clasterosporium carpophilum*, which was rather prevalent last year, may be checked by the application of 3 per cent copper-lime paste on the trunk and branches. The same treatment may also be given for gummosis of peach, apricot, and almond. Use of flowers of sulphur will prevent the development of fungous diseases on hot-house plants.—*Edith K. Cash.*

449. Voglino, P., e V. Bongini. **Consigli pratici per il mese di Gennaio. [Control measures recommended for the month of January.]** Pubbl. Mens. R. Osservatorio Fitopatol. Torino 1919^1: 1–2. 1919.—Spraying peach trees with a 5 per cent solution of ferrous sulphate or 3 per cent copper sulphate and lime is advised as a preventive against leaf curl (*Exoascus deformans*) and mildew (*Sphaerotheca pannosa*). Stored tubers should be spread out and aired to guard against molds.—*Edith K. Cash.*

MISCELLANEOUS (COGNATE RESEARCHES, TECHNIQUE, ETC.)

450. ANONYMOUS. **Fäulniserreger in Rübenmieten.** [**Producers of decay in beet pits.**] Mitteil. Deutsch. Landw. Ges. 36: 185. 1921.—This note calls attention to the discovery of *Botrytis cinerea* as the cause of decay in stored swedes.—*A. J. Pieters.*

451. HOXIE, F. J. **Treated lumber for insulating roofs of moist factories.** American Wood Preservers' Association: 1921.—Method is described of insulating a New England cotton-mill roof to prevent decay and sweating. Seven-eighths inch pine boards were treated in an open concrete tank (out-of-doors) for 20 hours in creosote at a temperature of 220°F.; 5 lbs. of creosote was absorbed per cubic foot. The boards were applied to the old roof without removing the slag or paper, on $\frac{7}{8}$ inch sleepers, leaving an air space between the slag and new roof. Upon the treated new surface was placed the usual 5-ply tar paper and slag. [Paper presented at 17th annual meeting American Wood Preservers' Association, Jan., 1921.]—*Walter H. Snell.*

452. WALDRON, J. W., C. R. HEMENWAY, J. N. S. WILLIAMS, WM. SEARBY, T. H. PETRIE, J. K. CLARKE, and H. P. AGEE. **Report of the committee in charge of the experiment station.** Rept. Exp. Sta. Hawaii Sugar Planters' Assoc. 1920: 1–4. 1920.—A discussion is presented of certain fungous and insect enemies of sugarcane, together with reports as to progress of the investigations concerning the improvement of sugarcane by seed selection, the possibilities of reducing the purity of the final molasses, and the condition of the soils of the various sugar plantations. The forestry situation as related to sugar production and the insect and disease enemies of forest trees are also considered.—*J. M. Westgate.*

453. WILDEMAN, E. DE. **Sur les théories de la myrmécophylie.** [**On the theories of myrmecophily.**] Compt. Rend. Acad. Sci. Paris **172**: 124–126. 1921.—This phenomenon is generally attributed to gall formation due to the activity of insects, but the author disagrees with this as a generalization universally applicable. He finds cases especially in *Acacia* in which the gall is apparently not to be attributed to insect activity. In some cases it has become hereditary. The relationship when insects are present seems to be more of a parasitism than a symbiosis.—*C. H. and W. K. Farr.*

PHARMACOGNOSY AND PHARMACEUTICAL BOTANY

HEBER W. YOUNGKEN, *Editor*

E. N. GATHERCOAL, *Assistant Editor*

(See also in this issue Entries 15, 35, 47, 59, 70, 105, 574)

454. ANONYMOUS. [Rev. of: KRAEMER, H. **Scientific and applied pharmacognosy.** *2nd ed., xxviii + 741 p.* John Wiley and Sons: New York; Chapman and Hall: London, 1920.] Nature **106**: 531. 1920.

455. BARDIER, E., ET E. MARTIN-SANS. **Variabilité de la toxicité du gui suivant son hôte.** [**Variability of the toxicity of mistletoe according to its host.**] Compt. Rend. Soc. Biol. Paris **83**: 379–381. 1920.—Officinal aqueous preparations from mistletoe growing upon spruce, apple, and poplar, when tested by intravenous injection into dogs and rabbits, showed great differences in toxicity, that from the poplar being far more poisonous than the extracts from mistletoe growing upon apple or spruce.—*E. A. Bessey.*

456. BLAIR, T. S. **Habit indulgence in certain cactaceous plants among the Indians.** Jour. Amer. Med. Assoc. **76**: 1033–1034. 1921.—Legislation to prohibit the use of "peyote" is pending in the U. S. A. Congress. Commercial peyote includes various products of cactaceous plants having narcotic effects. Among these are the "mescal button,"—the fruits of *Anhalonium lewini*,—the use of which is spreading among the Indian tribes of the South-

west. Its evil effects are similar to those of the Oriental Indian Hemp (*Cannabis*). Unfortunately, the mescal buttons are regarded with superstitious reverence and are used in religious ceremonials.—*Wm. B. Day.*

457. Bohrisch, P. **Ueber Tupelostifte. [Concerning tupelo tents.]** Pharm. Zentralhalle 62: 109–111. 1921.—The writer does not agree with Braun's statement, that tents made from tupelo wood, *Nyssa aquatica* L., are ineffective because they do not swell as readily as tents made from *Laminaria*. When the wood is pressed to from 1/4 to 1/5 of its diameter, it swells to about 3 times its thickness when placed in water.—*H. Engelhardt.*

458. Boulay, A. **Note sur les caractères et la composition de l'huile de Gillesiella congolana. [Character and composition of the oil of Gillesiella congolana.]** Bull. Sci. Pharm. 27: 626–628. 1920.—The fruit of *Gillesiella congolana* contains about 51 per cent of a yellowish-brown, transparent oil which has a taste recalling that of oil of sweet almond. It has the sp. gr. 0.9159, a saponification value 192.5, and an iodine value 93.8. The combined fatty acids melt at 29°C., have a saponification value of 205.7, and the molecular weight 272.2. They consist of 35 per cent of solid and 65 per cent of liquid fatty acids. The former consist of erucic and palmitic acids, while the latter are composed of oleic acid with a small amount of linolenic acid. These constants do not quite agree with those given by Pieraerts, but the author believes that the discrepancy is due to the fact that the samples examined differed considerably in weight and in size.—*H. Engelhardt.*

459. Bouquet, J. **Documents sur la matière médicale indigene dans l'Afrique du Nord (Sud Tunisien.- Extrême-Sud Constantinois.—Maroc Occidental.) [Reports on the native medicinal plants of northern Africa (southern Tunis; southernmost Constantine; western Morocco).]** Bull. Sci. Pharm. 23: 22–36, 73–84. 1921.—An exhaustive compilation of the various plants used for medicinal purposes in northeastern Africa.—*H. Engelhardt.*

460. Bridel, Marc. **Sur la conservation des préparations galéniques de gentiane obtenues avec une racine de gentiane séchée a l'air sans fermentation. [The stability of galenical preparations of gentian, obtained with an air-dried gentian without fermentation.]** Jour. Pharm. et Chimie 22: 411–418. 1920.—Both in the powdered drug and in the alcoholic extract, which had been kept for 9 years, no loss in carbohydrates had occurred. The loss in these substances was, however, a very great one in liquid alcoholic preparations. The percentage of gentiopicrin was only slightly reduced in a tincture prepared with 95 per cent alcohol, but more so in other alcoholic preparations and especially in one prepared by extracting the drug with boiling alcohol. It had entirely disappeared from the powdered drug when the latter still contained an appreciable quantity of a glucoside hydrolyzable by emulsin, probably a cleavage product of gentiopicrin. A tincture of gentian prepared by maceration with 60 per cent alcohol contained no gentiopicrin from the time of its preparation, but contained a glucoside with a reducing factor almost equal to that of β ethylglucoside.—*H. Engelhardt.*

461. Delaunay, M. P. **Présence de la loroglossine dans plusieurs espèces d'Orchidées indigenes. [Presence of loroglossin in several species of native Orchideae.]** Jour. Pharm. et Chimie 23: 265–272. 1921.—The glucoside loroglossin which was isolated from *Loroglossum hircinum* Rich. by Bourquelot and Bridel could also be isolated from *Orchis simia* Lam., *O. bifolia* L., *Cephalanthera grandifolia* Babingt., *Ophrys aranifera* Huds., and *O. apifera* Huds. The Orchideae which are closely related botanically by their morphological character are also closely related chemically.—*H. Engelhardt.*

462. Diedrichs, A., und B. Schmittmann. **Über indisches Curry-Pulver. [Indian curry powder.]** Zeitschr. Untersuch. Nahrungs- u. Genussmittel 40: 361–364. 1920.—Chemical analyses.—*H. G. Barbour.*

463. Mackay, A. H. **The alkaloids of Senecio Jacobaea.** Nature 106: 503. 1920.—Correction in earlier article (Nature 106: 321. 1920). The plant has not been fatal to sheep as it has to cattle.—*O. A. Stevens.*

464. Maiden, J. H. **Plants which produce inflammation or irritation of the skin.** Agric. Gaz. New South Wales 32: 206. 1921.—Evidence is meagre that "brigalow itch" is caused by brigalow, *Acacia harpophylla. Xanthium strumarium* and species of *Callitris* (pine) are said to cause dermatitis.—*L. R. Waldron.*

465. Maue, G. **Über die Inhaltsstoffe der Rhabarberblätter.** [Content of rhubarb leaves.] Zeitschr. Untersuch. Nahrungs- u. Genussmittel 40: 345–350. 1920.—The leaves are the most valuable part of rhubarb as a vegetable. The only constituents responsible for various cases of poisoning are the acids known as emodin (frangulinic) and chrysophanic acids, which are bound to soluble oxalic acid and oxymethylanthrochinon.—*H. G. Barbour.*

466. Pieraerts, J. **Sur l'Héritiera littoralis Ait.** [Concerning Heritiera littoralis Ait.] Bull. Sci. Pharm. 23: 15–22. *Pl. 2, fig. 4.* 1921.—Kola nuts are frequently adulterated with the seeds of *Heritiera littoralis*, a plant native to East Africa but also found in other tropical countries of the Old World. The plant is a large tree, its wood grayish-brown, is very suitable for building material, and its bark, which is rich in tannins, is used for tanning purposes. The fruit is an akene, the pericarp of which is colored light brown externally, has a ligneous consistency and a more or less spongy internal texture. The dorsal surface of the fruit is convex, keel-shaped, and is provided throughout its length with a very pronounced median relief, which terminates at the rostrum. The seed does not contain caffeine and theobromine. Volatile oil is present in the drug; also a fixed oil, the latter amounting to 10 times the quantity present in kola. The fixed oil, unlike that of the kola nut, gives Halphen's reaction.—*H. Engelhardt.*

467. Prescher, J., und R. Claus. **Zwei eigenartige Ersatzmittel.** [Two peculiar substitutes.] Zeitschr. Untersuch. Nahrungs- u. Genussmittel 40: 208. 1920.—A microscopic and chemical analysis of substitutes for cinnamon powder and rice starch. The substitute for the latter consisted of potato starch with ballast, such as sand, chalk, etc.—*H. G. Barbour.*

PHYSIOLOGY

B. M. Duggar, *Editor*

Carroll W. Dodge, *Assistant Editor*

(See also in this issue Entries 105, 160, 226, 230, 280, 437, 460, 461, 540, 543, 546, 551, 552, 555, 556)

GENERAL

468. Lumière, Auguste. **Le mythe des symbiotes.** [The symbiosis myth.] *xi + 206 p., 60 fig.* Masson et Cie.: Paris, 1919.—The material brought together in this little book is intended to exhibit some of the diverse rôles of microorganisms in nature, and more particularly to indicate the limited extent to which such organisms occur in symbiotic association with higher forms, and the specific nature of such associations. The facts are collated with the view of combatting the fundamental ideas of Portier to the effect that "the bacteria are the only simple organisms, all higher organisms being of a double nature;" that is, such higher forms include bacteria within their protoplasts. The work involves brief discussions of such topics as the following: Symbiosis in plants, as in orchids; the conditions of occurrence and the nature of the saprophytic organisms found occasionally or normally in certain organs of higher animals; vitamines; mitochondria; and asepsis.—*B. M. Duggar.*

DIFFUSION, PERMEABILITY

469. Anonymous. [Rev. of: Findlay, Alexander. **Osmotic pressure.** *2nd ed., xi + 116 p., 10 fig.* Longmans Green & Co.: London.] Sci. Prog. [London] 14: 158–159. 1919.

470. Buscalioni, Luigi. **Nuove osservazioni sulle cellule artificiali.** [**New observations on artificial cells** (conclusion).] Malpighia 28: 489–544. *Pl. 3, fig. 1–2.* 1920.—Experiments of the author have confirmed previous discoveries and added new data in regard to artificial cells, in which certain of the structures and physiological processes of living cells have been reproduced. Appended to the article is an extensive bibliography (pages 521–540) annotated by the author.—*Edith K. Cash.*

471. Dixon, H. H., and T. G. Mason. **A cryoscopic method for the estimation of sucrose.** Notes Bot. School Trinity Coll. Dublin 3: 83–89. 1920.—Since the depression of the freezing point caused by a given quantity of sucrose in a given volume of water is approximately doubled after inversion, the sucrose content of a solution can be determined by 2 cryoscopic observations,— one before and the other after inversion. No preliminary treatment for the removal of gums, etc., is necessary. Such treatment would be necessary for both polarimetric and copper methods. By using the thermo-electric method of cryoscopy a very small amount of plant sap (2½ cc.) is sufficient for a determination. The probable error with this method is a little greater than with Fehling's solution.—*G. B. Rigg.*

472. Mason, T. G. **On some factors affecting the concentration of electrolytes in the leaf-sap of Syringa vulgaris.** Notes Bot. School Trinity Coll. Dublin 3: 67–82. 1920.—The determination of the concentration of electrolytes in leaf-sap by conductivity observations was found unsatisfactory unless allowance was made for the viscosity of the sap. To make this correction, the conductivity of the sap was determined, then $\frac{N}{10}$ KCl was dissolved in it and the conductivity again determined. Then the conductivity of $\frac{N}{10}$ KCl in aqueous solution was determined. By comparing the value obtained by the last observation with the difference between those obtained by the first 2 the effects due to viscosity were determined.—The osmotic pressure of the cell sap is frequently mainly due to electrolytes, but the presence of solutes that are neither electrolytes nor sugars may play a part. A tendency was found for the content of electrolytes to vary inversely with that of the non-electrolytes. It is suggested that these fluctuations are associated with the rate of carbon assimilation, which determines the rate at which electrolytes are removed from solution in metabolism.—*G. B. Rigg.*

WATER RELATIONS

473. Bouyoucos, George J., and M. M. McCool. **Measurement of the amount of water that seeds cause to become unfree and their water soluble material.** Jour. Agric. Res. 20: 587–593. 1921.—The amount of unfree water, consisting of (a) capillary and adsorbed, and (b) combined (water of hydration and water of solid solution), was determined by the type of dilatometer used in a previous study of soils (see Bot. Absts. 9, Entry 535). Fourteen different kinds of seeds were used. The amount of water that seeds cause to become unfree is very large. Repeated freezing and thawing tend to diminish considerably the amount of unfree water, especially in some seeds. Dry seeds contain a large amount of water-soluble matter as is evidenced by the high freezing point depression.—*Evelyn I. Fernald.*

474. Hill, T. G. **The water economy of maritime plants.** Sci. Prog. [London] 14: 60–80. 1919.—The author carried out a series of experiments with halophytic plants, particularly with such forms as *Salicornia* and *Suaeda*, on the coast of Brittany, supplemented by work in the laboratory. The investigations were concerned primarily with (1) osmotic relations, (2) transpiration, and (3) absorption.—It was found that the osmotic power of the cell sap of the root hairs can be adjusted to the salt content of the soil. Transpiration was found to be remarkably high and variable for the plants in question, and in all cases it was greater

than for a typical mesophyte. Likewise the loss of water from succulent plants was considerably in excess of that from certain specified mesophytes. Experiments in which the aerial parts were immersed showed that the plants could absorb water, the amount taken up varying with the concentration of the salt solution, and the length of time they were submerged. Absorption was more rapid when the plants were immersed in fresh water than in sea-water. Experiments showed also that the aqueous vapor of the atmosphere could be utilized.—*L. L. Harter.*

475. Sahasrabuddhe, D. L. **A preliminary note on the effect of waterings on the amount of acids secreted by the gramplant** [Cicer Arietinum]. Agric. Jour. India 15: 636–639. 1920.—In previous work (Agric. Res. Inst. Pusa Bull. 45. 1914) it was found that the gramplant was continually producing acid during its period of growth; the acids were found to be malic and oxalic. Glandular hairs which are found in large proportion on the ovaries are acid producing. Experiments in pots, recorded in this paper, show that the greater the amount of watering the greater the acidity of the plant.—*J. J. Skinner.*

MINERAL NUTRIENTS

476. Breazeale, J. F., and Lyman J. Briggs. **Concentration of potassium in orthoclase solutions not a measure of its availability to wheat seedlings.** Jour. Agric. Res. 20: 615–621. 1921.—The orthoclase used was obtained near Riverside, California. It contained 12.5 per cent potassium oxide. Aqueous extracts contained 2–9 parts per million soluble potassium. Experiments with wheat seedlings showed that the soluble potassium in aqueous solution derived from finely ground orthoclase is not absorbed to a measurable degree. The availability of potassium is not increased by addition of calcium carbonate or sulphate, carbon dioxide, or by boiling, but it is increased by oxidizing the solute with hydrochloric or nitric acid. The action of the acids is to break down the complex solute molecule.—*D. Reddick.*

477. Buckner, G. Davis. **Comparative utilization of the mineral constituents in the cotyledons of bean seedlings grown in soil and in distilled water.** Jour. Agric. Res. 20: 875–880. 1921.—A notably larger amount of reserve material was translocated from the cotyledons when the beans were grown in soil than when grown in distilled water. In either case a smaller proportion of calcium is translocated than of phosphorus or of magnesium.—*D. Reddick.*

478. Davis, A. R. **The variability of plants grown in water cultures.** Soil Sci. 11: 1–32. *Fig. 1–12.* 1921.—The variability of Sonora wheat grown 5 weeks in 33 replicate water culture solutions and 33 days in 50 replicate water culture solutions showed a range of 20 per cent on either side of the mean for culture weights and about 50 per cent when individual cultures were considered. Chance selections of duplicate cultures in the first series showed means varying from 1.82 to 2.55 gm.—*W. J. Robbins.*

479. Espino, Rafael B. **Some aspects of the salt requirements of young rice plants.** Philippine Jour. Sci. 16: 455–523. *Pl. 1, fig. 1–9.* 1920.—These studies deal with the mineral nutrition of lowland rice plants for the phase of their development represented by the 3-week period following germination. The experiments were carried out in spring and summer in a Baltimore greenhouse. The best results were obtained by the use of a 4-salt solution, monopotassium phosphate, calcium nitrate, magnesium sulphate, and ammonium sulphate with trace of ferric phosphate.—*Albert R. Sweetser.*

480. Jones, Linus H., and John W. Shive. **The influence of iron in the forms of ferric phosphate and ferrous sulfate upon the growth of wheat in a nutrient solution.** Soil Sci. 11: 93–99. *Pl. 1, fig. 1.* 1921.—The growth of wheat in water cultures containing mineral salts, to which iron phosphate or iron sulphate containing equivalent amounts of iron were added, indicates that iron sulphate is a more available source of iron for wheat than iron phosphate.—*W. J. Robbins.*

481. LAGATU, H. **Sur le rôle respectif des trois bases: potasse, chaux, magnésie, dans les plantes cultivées. [On the respective rôles of the three bases: potassium, calcium, and magnesium, in cultivated plants.]** Compt. Rend. Acad. Sci. Paris **172**: 129–132. 1921.—These bases are compared as to the amounts required by various agricultural plants and a diagram is constructed comparing the plants in these respects.—*C. H. Farr.*

482. LESAGE, PIERRE. **Plantes salées et période des anomalies. [Plants grown in salty solutions and the degree of their modification.]** Compt. Rend. Acad. Sci. Paris **172**: 82–84. 1921.—*Lepidium sativum* was grown for 10 successive seasons in solutions containing high concentrations of salt and also in solutions of normal concentration. A comparison was made of the height of the plants and of the size and weight of the seeds. Plants grown in salt water are not so tall as those grown in fresh water, unless seeds from plants which grew in salt water are used. In the latter case the plants produced from these seeds are taller if grown in salt water than if grown in fresh water. This difference does not hold in the case of seed size and weight, in which cases the seeds produced on plants growing in salt water are always somewhat smaller and lighter than those grown in fresh water.—*C. H. Farr.*

483. NICOLAS, G. **Contribution à l'étude du mécanisme de l'action fertilisante du soufre. [A study of the rôle of sulphur.]** Compt. Rend. Acad. Sci. Paris **172**: 85–87. 1921.—Flowers of sulphur were added to the soil. Beans grown in soil containing such sulphur showed an increase in the total weight of the seeds produced and in the weight of individual seeds. Very little if any starch was found stored in any part of the plant if grown without sulphur or on soil containing 100 or 300 kg. of sulphur per hectare. But abundant starch was present in both the stem and roots when plants were grown on soil containing 200 kg. of sulphur. The same relation held for peas, except that the optimum was at 300 kg. Sweet peas and lupines were also studied. The author agrees with MAZE and DEMOLON that sulphur is necessary in chlorophyll formation.—*C. H. Farr.*

484. SERRA, AURELIO. **Applicazione dei metodi microcristallografici al riconoscimento degli elementi minerali contenuti nei vegetali. [Application of microcrystallographic methods to the determination of mineral elements in plants.]** Malpighia **28**: 558–560. 1920.—The author describes his method of preparing plant tissues for determining mineral crystals contained in them, and also notes the possible value of this line of investigation in the study of the soil requirements of plants.—*Edith K. Cash.*

485. SERRA, AURELIO. **La cristallizzazione negli organi vegetali. [Crystallization in plant organs.]** Malpighia **28**: 555–557. 1920.—From the examination of tissues of various plants (*Ricinus*, *Oxalis*, *Citrus*, etc.) the conclusion was reached that crystallization occurs most frequently in aerial portions; and that it is furthered by processes of osmosis and assimilation and the evaporation caused by temperature and ventilation— all of the influences which tend to concentrate the solution in which crystalline molecules are deposited.—*Edith K. Cash.*

486. TRELEASE, SAM F. **The growth of rice as related to the proportions of fertilizer salts added to soil cultures.** Philippine Jour. Sci. **16**: 603–627. *Fig. 1–5.* 1920.—The present study deals with the growth of rice plants in soil cultures to which the 3 elements, phosphorus, nitrogen, and potassium, were added in various proportions.—*Albert R. Sweetser.*

487. WILLAMAN, J. J. **Comparative salt absorption.** [Rev. of: STILES, W., AND F. KIDD. (1) **The influence of external concentration on the position of the equilibrium attained in the intake of salts by plant cells.** Proc. Roy. Soc. London B **90**: 448–470. 1919 (see Bot. Absts. 5, Entry 864); (2) **The comparative rate of absorption of various salts by plant tissue.** Proc. Roy. Soc. London B **90**: 487–504. 1919 (see Bot. Absts. 5, Entry 851); (3) STILES, W., AND W. JÖRGENSEN. **On the relation of plasmolysis to the shrinkage of plant tissue in salt solutions.** New Phytol. **18**: 40–50. 1919 (see Bot. Absts. 3, Entry 434).] Bot. Gaz. **69**: 190–191. 1920.

488. WIRTHLE, F., UND K. AMBERGER. **Über Weinhefe und deren Kupfergehalt.** **[Copper content of dregs of wine.]** Zeitschr. Untersuch. Nahrungs- u. Genussmittel 40: 365–366. 1920.

PHOTOSYNTHESIS

489. DIXON, H. H., AND H. H. POOLE. **Photosynthesis and the electronic theory.** Notes Bot. School Trinity Coll. Dublin 3: 90–104. 1920.—Negative electrons seem to be entirely responsible for the absorption of radiant energy from the ether. It is by this means that chlorophyll renders carbon dioxide and water reactive in the presence of light. The view that light energy becomes available for photosynthesis through the intermediary of the electrons is in accordance with sound reasoning and is verified by experiment.—The wave lengths that are effective in displacing the electrons of chlorophyll as indicated by its sensitizing action on the photographic plate, are the same as those that are effective in photosynthesis. Photosynthesis is apparently caused by light, the frequency of which is too low to effect the expulsion of the electrons from the chlorophyll molecule.—It seems that the atomic groups of leaf pigment enter into the reactions of photosynthesis and participate in the combinations and decompositions that ultimately lead to the formation of carbohydrates and the evolution of oxygen. Theories of photosynthesis, then, which assume that the chlorophyll itself enters into the reactions, are to be preferred to those suggestions which suppose that the reaction is accomplished externally to the chlorophyll by means of the energy absorbed and transformed by the latter.—*G. B. Rigg.*

490. MAZÉ, P. **Sur le mécanisme chimique de l'assimilation du gaz carbonique par les plantes vertes. [On the chemical mechanism of the assimilation of carbon dioxide by green plants.]** Compt. Rend. Acad. Sci. Paris 172: 173–175. 1921.—The author attributes to hydroxylamine a rôle of primary importance in the synthesis of compounds from which carbohydrates are produced. He suggests the following reactions as a possible explanation of the process of photosynthesis: $NH_2OH + CO_2 = CO_2NH_2OH$ or $CO_3H_2NH_2OH$, $2(CO_2NH_2OH) = CH_2OH + CHO + HNO_2$, or $2(CO_3H_2NH_2OH) = CH_2OH + CHO + 2HNO_2 + 2H_2O$, $HNO_2 + H_2O = NH_2OH + O_2$.—*C. H. Farr.*

METABOLISM (GENERAL)

491. AMBERGER, C. **Über die Zusammensetzung des Rüböls. [Composition of rapeseed oil.]** Zeitschr. Untersuch. Nahrungs- u. Genussmittel 40: 192–201. 1920.

492. BARLOT. **Sur un nouveau réactif des Lactaires et des Russules à saveur âcre. [A new reaction for Lactarias and Russulas having a bitter taste.]** Compt. Rend. Acad. Sci. Paris 172: 87–89. 1921.—Color reactions are given with methyl chloroantimoniate. They are found to be diagnostic of certain species.—*C. H. Farr.*

493. BAU, A. **Die Bestimmung der Oxalsäure in Tee, Kaffee, Marmeladen, Gemüsen und Brot. [Oxalic acid determination in tea, coffee, marmalade, vegetables, and bread.]** Zeitschr. Untersuch. Nahrungs- u. Genussmittel 40: 50–66. 1920.

494. BLUNCK, G. **Quantitative Bestimmung physikalisch-chemischer Eigenschaften mikroskopisch-kleiner Mengen. [Quantitative determination of the physical chemical characters of microscopic masses.]** Zeitschr. Wiss. Mikrosk. 37: 138–140. 1920.

495. BÖMER, A., UND J. BAUMANN. **Beiträge zur Kenntnis der Glyceride der Fette und Öle. IX. Die Glyceride des Cocosfettes. [Glycerides of cocoanut fat.]** Zeitschr. Untersuch. Nahrungs- u. Genussmittel 40: 97–151. 1920.—Considerable caprylic acid was found but no caproic or caprinic. Besides oleic acid there are small amounts of palmitic and stearic acids. The principal glycerides of the saturated fatty acids of cocoanut fat consist of myristin compounds.—*H. G. Barbour.*

496. LINOSSIER, G. **Les vitamines et les champignons. [Vitamines and fungi.]** Compt. Rend. Soc. Biol. 83: 346–349. 1920.—Certain fungi, *Oidium lactis*, *Aspergillus niger*, and *Penicillium glaucum*, are able to grow in pure culture in media lacking vitamines, but containing the necessary mineral nutrients, an ammonium salt, and glucose. Only on greatly reducing the nutrients does the 1st and sometimes the 2nd show feebler growth as compared with similar dilute solutions to which has been added a drop or so of sap or orange juice. Other fungi, like beer yeast and *Mycoderma vini*, easily show a marked difference when the vitamines are added. The fungi of the 1st group excrete into the culture media vitamines which stimulate the growth when added to the cultures of the fungi of the 2nd group. Yeast with vitamines exhausted all sugar of the medium in 11 days, without vitamines in 27 days. The weight of the fungus was respectively 10 and 6 mg. In another case in equal lengths of time the amount of sugar consumed was 1.6 and 1.16 gm. and the weight of fungus 16 and 8 mg., respectively for cultures with and without added vitamines.—*E. A. Bessey.*

497. MANNICH, C., UND K. LENZ. **Über eine Methode zur polarimetrischen Bestimmung der Stärke in Calciumchloridlösung. [Polarimetric determination of starch in $CaCl_2$ solution.]** Zeitschr. Untersuch. Nahrungs- u. Genussmittel 40: 1–11. 1920.

498. MITRA, S. K. **Seasonal changes and translocation of carbohydrate materials in fruit spurs and two-year-old seedlings of apple.** Ohio Jour. Sci. 21: 89–103. 1921.—Analyses for glucose, maltose, sucrose, total sugars, and readily hydrolyzed polysaccharides (called starch), as well as determinations of hydrogen-ion concentration, were made on samples of 1 year old stems, 2 year old stems, and roots of apple seedlings, and on apple spurs. The samples were collected twice a month during a year. No distinction is indicated between non-bearing spurs and spurs bearing fruit. The data are given in terms of dry weight. A correlation is pointed out between carbohydrate changes and hydrogen-ion concentration as this is known to favor the action of diastase or maltase.—*H. D. Hooker, Jr.*

499. PLAHL, LME. W. **Zum Nachweis der Oxalate in Pflanzengeweben. [Identification of oxalates in plant tissues.]** Zeitschr. Wiss. Mikrosk. 37: 130–135. 1920.—The method depends on precipitation with $AgNO_3$ in the presence of HNO_3, other organic acids remaining in solution.—*H. G. Barbour.*

500. SAUVAGEAU, C. **Sur la membrane de quelques algues floridées et sur la gélation de l'hydrosol gélosique. [On the membrane of certain red algae and the gelation of the gelatinous hydrosol.]** Compt. Rend. Acad. Sci. Paris 171: 606–609. 1920.—Two types of indigenous red algae are used commercially as sources of agar and similar substances. The *Chondrus* type has an envelope of pecto-cellulose, the pectic portion upon gelation yielding the mucilage. The *Gelidium* type contains in addition a substance staining violet in iodine to which the name amyloid is applied. The changes taking place in this amyloid during cooking and boiling are described. This substance is found in species of *Gelidium*, *Gracilaria*, *Laurencia*, *Cystoclonium*, *Pterocladia*, *Ahnfeldia*, and *Porphyra.*—*C. H. Farr.*

METABOLISM (NITROGEN RELATIONS)

501. GUGGENHEIM, M. **Die biogenen Amine und ihre Bedeutung für die Physiologie und Pathologie des pflanzlichen und tierischen Stoffwechsels. [The biogenous amines and their significance for the physiology and pathology of plant and animal metabolism.]** Monographien aus dem Gesamtgebiet der Physiologie der Pflanzen und der Tiere 3: 1–376. Julius Springer: Berlin, 1920.—The point of view of the author is somewhat indicated by the fact that he recognizes the term 'biogenous amines' to represent no definitive physiological or chemical group, this name being considered preferable, however, to proteinogenous amines—since the latter implies a direct and invariable relation to the proteins. After a preliminary general account the author gives brief characterizations of the various larger groups. The substances included are treated under 9 topical headings, as follows: Alkylamines (methylamine, etc.), alkanol-

amines (cholin, etc.), neurin group, diamines (lysin, etc.), guanidin compounds, imidazole (histidin), betaines and α-amino acids, the phenylalkyl- and phenylalkanolamines (ephedrin, adrenalin, etc.), and indole thylamine. Under each substance there is a brief account of its discovery, occurrence and origin, composition, methods of preparation, and, so far as possible, its biological significance. The author regards the further study of these bodies as most important, offering such possibilities as rational explanations of vitamines, increased light on phenomena of virulence and immunity, and rapidly advancing knowledge in the field of internal secretions.—*B. M. Duggar.*

502. Mannich, C., und G. Wipperling. **Die Trennung und quantitative Bestimmung von Protein und Nichtprotein-Stickstoff durch Ultrafiltration. [Separation and quantitative determination of protein and non-protein nitrogen by ultrafiltration.]** Zeitschr. Untersuch. Nahrungs- u. Genussmittel 40: 12–20. 1920.—Beans, hops, carrots, potatoes, cottonseed, and wheat were analyzed. While the results varied considerably from parallel determinations by the accepted method, it is claimed that ultrafiltration will prove useful.—*H. G. Barbour.*

503. Strowd, W. H. **The forms of nitrogen in soy-bean nodules.** Soil Sci. 11: 123–130. 1921.—An examination of 100 gr. of soybean nodules failed to show the cyanide radical by a method sensitive to 0.01 mg. of hydrocyanic acid. Of the total nitrogen in nodules 30–40 per cent is water-soluble and 40–55 per cent soluble in 10 per cent salt or dilute alkali. About 3 per cent of the water-soluble nitrogen was protein or proteose. No globulin and only a small amount of albumin was found. Primary amino nitrogen formed 16 per cent of the protein-free water-soluble nitrogen, and amide nitrogen 19.3 per cent. Over 60 per cent of the total water-soluble nitrogen was precipitated by phospho-tungstic acid.—*W. J. Robbins.*

504. Woodard, J. **Tyrosin in fungi.** [Rev. of: Dodge, C. W. **Tyrosin in the fungi: chemistry and methods of studying the tyrosinase reaction.** Ann. Missouri Bot. Gard. 6: 71–92. 1919 (see Bot. Absts. 4, Entry 1446).] Bot. Gaz. 69: 191. 1920.

METABOLISM (ENZYMES, FERMENTATION)

505. Anonymous. [Rev. of: Effront, Jean. **Biochemical catalysts in life and industry. Proteolytic enzymes.** *xii + 752 p.* John Wiley & Sons: New York; Chapman & Hall: London, 1917.] Sci. Prog. [London] 14: 347–348. 1919.

506. Bridel, M., et R. Arnold. **Sur l'emploi de divers agents de précipitation dans la préparation de l'émulsine des amandes. [The use of different precipitation agents in the preparation of the emulsin of almonds.]** Jour. Pharm. et Chimie 23: 161–168. 1921.—Emulsin of almonds is generally prepared by Hérissey's process, that is, macerating the almonds with water, removing the casein by means of acetic acid, and precipitating the ferment by strong alcohol. Thus a mixture of ferments is obtained which consists of emulsin proper or β glucosidase, lactase, gentiobiase, cellobiase, melibiase, manninobiase, β galactosides, and a small amount of invertin. When alcohol is replaced by methyl alcohol or acetone and when too long a contact of the precipitant with the ferments is avoided, a ferment is obtained which possesses practically all the properties of ordinary emulsin. Furthermore, when the ferment is allowed to remain in contact with the precipitation liquid for too long a time an emulsin is obtained which is devoid of certain other ferments.—*H. Engelhardt.*

507. Harter, L. L. **Amylase of Rhizopus tritici, with a consideration of its secretion and action.** Jour. Agric. Res. 20: 761–786. 1921.—A vigorous starch-splitting enzyme is secreted by *R. tritici*. The enzyme from old mycelium is less active than that from young. Storage of the dried mycelium for several months at from 9° to 35°C. does not lessen its power of digestion, but at 60° it becomes gradually less. The optimum temperature for the digestion of starch is about 45°C. The hydrolytic capacity is destroyed in 100 hours at 60°C. Glucose retards the hydrolysis of starch paste, although the quantity of glucose does not influence the results. With a constant amount of enzyme powder hydrolysis increases with the increase in volume

of the solution up to a certain point, and then decreases. An end point in the hydrolysis is not reached without altering the equilibrium of the system, as by changing the temperature and diluting the solution. If judged by the iodine test an end point was obtained, but a quantitative determination of the reducing sugars did not account for all of the starch. When the enzyme is in suspension some of it is removed by filtering through Whatman chemically-prepared filter paper. Using equal weights of enzyme powder it was found that mycelium grown at 9° hydrolyzed about 4 times as much starch in the same length of time as mycelium grown at 40°C. The enzyme power of mycelium grown at 29°C. was intermediate between the 2. At these 3 temperatures the best growth of the fungus was made at 29° and the poorest at 9°C. There is "quantitative regulation" of the enzyme. The hydrolyzing power of mycelium is much greater when starch alone is used as a source of carbon than when glucose alone, or in combination with starch, was employed. However, if grown on sweet potato bouillon, which contains both starch and sugars, a unit weight of the mycelium will hydrolyze more starch than when grown on any of the other combinations. The vigor of growth of the fungus was correlated with the hydrolytic power of the enzyme powder. The results seem to indicate that it is not so much the source of the carbohydrate which influences the quantitative production of the enzyme as it is the influence which it has on the growth of the fungus on which the secretion of the enzyme depends.—*L. M. Massey.*

508. LEONCINI, G. **Di un'ossidasia vegetale agente sulla florizina. [An oxidase of vegetable origin acting upon phloridzin.]** Staz. Sperim. Agrarie Ital. **53:** 138–145. 1920.—When wheat kernels are allowed to remain in a solution of phloridzin at a temperature of 15–20°C. these soon become surrounded by a zone of yellow liquid. This zone extends to include the whole solution if the seed are allowed to remain for a few hours longer. The same phenomenon takes place when the seed have previously been sterilized with a 2 per cent $CuSO_4$ solution, or with formaldehyde. The seed of various other Graminaceae were tried and found to give negative results. The flour of the *Triticum* seed also gave negative results, while the bran was found to give positive results. The action was stopped when the seed were heated to 100°C. for 5 minutes or if the seed were placed in a system from which all the oxygen had been removed by means of a mercury pump. Sterile apple pulp gave a similar result. In a solution of tyrosine, however, no change took place. Beet pulp acted on both solutions, although its oxidizing power upon phloridzin is greater than upon tyrosine. The author concludes from these findings that some plants contain an oxidase capable of oxidizing phloridzin to a yellow substance probably of a quinoid structure, a change which permits the assumption that phloridzin behaves as a true chromogen.—*A. Bonazzi.*

509. MASON, T. G. **On the inhibition of the invertase in the sap of Galanthus nivalis.** Notes Bot. School Trinity Coll. Dublin **3:** 105–119. 1920.—Since the depression of the freezing point of a sucrose solution is approximately doubled by complete inversion of the sucrose, it seemed probable that an approximate estimate of the sucrose content of the sap of leaves could be obtained by observing the increase in the depression of the freezing point after storage at a suitable temperature. It was found, however, that other factors (one or more) present in extracted sap tended to limit the activity of the enzyme. Changes of a nature not yet understood (possibly H-ion concentration) occurring in extracted juice lead to a clumping of the colloids. It is suggested that the enzyme may be inactivated by adsorption on the coagulated colloids. The experiments performed suggest that in cases of sucrose storage in living leaves the activity of the enzyme tending to invert it is regulated by reversible precipitation of the colloid (anti-enzyme).—*G. B. Rigg.*

METABOLISM (RESPIRATION, AERATION)

510. ROCKWELL, G. E. **A study of the gaseous requirements for the growth of various bacteria.** Jour. Infect. Diseases **28:** 352–356. *Fig. 1.* 1921.—The author finds that the growth of some bacteria ordinarily considered to be of the aerobic and of the facultative anaerobic group is in some way favored by CO_2. Strict anaerobes cannot use even traces of atmospheric oxygen.—*Selman A. Waksman.*

ORGANISM AS A WHOLE

511. Beau, Clovis. **Sur le rôle trophique des endophytes d'Orchidées. [The nutritive rôle of endophytes of orchids.]** Compt. Rend. Acad. Sci. Paris 171: 675–677. 1920.—The small amount of food stored in the very minute seeds of orchids indicates that the mycelium of the endophyte supplies necessary foods from the surrounding medium at early stages of development. Experiments were performed with germinating orchid seed in Petri dishes. A block of nutritive gelatin was introduced and the culture infected with the endophytic mycorhiza. The hyphae were positively chemotropic towards gelatin and a connection is soon established by the hyphae between the gelatin and the seed. If these hyphae are destroyed the seed cease developing even though other hyphae may connect the seeds with distilled water. This may explain why some orchids may even reach the blooming stage in an aetiolated condition with little or no chlorophyll or light.—*C. H. Farr.*

512. Church, A. H. **The building of an autotrophic flagellate.** Bot. Mem. [Oxford] 1. *27 p.* 1919.—The author discusses the evolution of an autotrophic flagellate of pelagic plankton comparable with that from which the ancestral forms of the Phaeophyceae may have been derived. Evolution is considered and briefly discussed with reference to the following factors: Ionic relations, the external source of energy, photosynthesis, proteid-synthesis, balance of carbohydrate synthesis and proteid synthesis, growth, day and night, surface-tension, contractibility, differentiation of plasmatic tracts, polarity, the flagellum, binary fission, failure and death, holozoic nutrition, flagellar nutrition, plasmogamy and the origin of sexual fusion, differentiation of flagella, comparative dimensions, encystment, and formation of the cell wall.—*J. S. Cooley.*

513. Jones, H. A. **Physiological study of maple seeds.** Bot. Gaz. 69: 127–152. *2 fig.* 1920.—This is a study of the viability of the seed of the sugar maple (*Acer saccharum*) and the river maple (*Acer saccharinum*). The sugar maple seed mature in the fall, contain much fat and protein but little carbohydrate, and pass through a period of after-ripening before germination. The river maple seed mature in the spring, contain much starch but little fat and protein, and must germinate almost at once if at all.—The seed of the river maple lose their viability when the water content is reduced to 30–34 per cent. Temperature plays but little part in determining the critical point of water loss. The seed may be kept in a vigorous viable condition for a considerable time if stored over water at O°C. Respiratory activity in the desiccating seed at 25°C. first decreases slightly, then rises to a maximum, then gradually falls to zero as desiccation progresses. After a slight initial increase, catalase activity gradually decreases in the desiccating seed, but it increases enormously during the early stages of germination. A gradual decrease in peroxidase activity accompanies desiccation.—Sugar maple seed after-ripen best at temperatures near 5°C., with a good supply of oxygen and moisture, and show at that time a considerable increase in free-reducing sugars. Catalase activity increases greatly with after-ripening and germination, and there is also a slight increase in peroxidase activity. The hypocotyl as well as the entire embryo has a distinct alkaline reaction in both dormant and after-ripened seed. Fully after-ripened seed will remain in this condition for a long time if kept moist at −5°C.—*H. C. Cowles.*

514. Shull, C. A. **Susceptibility gradients.** [Rev. of: Child, C. M. (1) **Axial susceptibility gradients in algae.** Bot. Gaz. 62: 89–114. 1916; (2) **Further observations on axial susceptibility gradients in algae.** Biol. Bull. 31: 419–440. 1916; (3) **Susceptibility gradients in the hairs of certain marine algae.** Biol. Bull. 32: 75–92. 1917; (4) **Experimental alteration of the axial gradient in the alga Griffithsia Bornetiana.** Biol. Bull. 32: 213–233. 1917; (5) **Demonstration of the axial gradients by means of potassium permanganate.** Biol. Bull. 36: 133–147. 1919.] Bot. Gaz. 69: 187–188. 1920.

515. Walker, Leva B. **Biology and culture of the higher fungi.** [Rev. of: Boyer, G. **Études sur la biologie et la culture des champignons supérieurs.** *116 p., 4 pl., 20 fig.* Bordeaux, 1918 (see Bot. Absts. 5, Entry 1931).] Bot. Gaz. 69: 188–189. 1920.

GROWTH, DEVELOPMENT, REPRODUCTION

516. CROCKER, WILLIAM. **Conditions affecting flower development.** [Rev. of: (1) KLEBS, GEORGE. **Ueber die Blütenbildung von Sempervivum.** (Flower formation in Sempervivum.) Flora 11–12: 128–151. *5 fig.* 1918 (see Bot. Absts. 2, Entry 601); (2) FISCHER, H. **Zur Frage der Kohlensäure-Ernährung der Pflanzen.** (Carbonic acid nutrition of plants.) Gartenflora 65: 232–237. 1916; (3) KRAUS, E. J., AND H. R. KRAYBILL. **Vegetation and reproduction with special reference to the tomato.** Oregon Agric. Exp. Sta. Bull. 149. *90 p.* 1918 (see Bot. Absts. 1, Entry 1402).] Bot. Gaz. 67: 445–446. 1919.

517. MITSCHERLICH, E. A. **Ein Beitrag zum Gesetze des Pflanzenwachstums.** [The law of plant growth.] Fühling's Landw. Zeitg. 68: 130–133. 1919.—The author calls attention to a general phenomenon of growth in organisms, viz., slow initial growth, a period of rapid growth, and a period of slow growth as maturity sets in.—He reports determinations of dry weight produced during the grand period of growth in cultures of peas and mustard. Determinations were made at quasi-definite stages of growth; for example, the appearance of the 1st tendril-bearing leaves, and of 4th pair of leaves (in peas). The stages of growth did not represent the same time interval in all cases.—Values closely approximating the observed were given by the equations,

$$\text{for peas, log.}\left(1.345 - \sqrt[15]{y}\right) = .1286 - .24x;$$

$$\text{for mustard, log.}\left(1.26 - \sqrt[15]{y}\right) = .1 - .4x;$$

in which y = the average dry weight of plants at the xth growth period. — *H. S. Reed.*

518. MITSCHERLICH, E. A. **Zum Gesetze des Pflanzenwachstums.** [The laws of plant growth.] Fühling's Landw. Zeitg. 68: 419–426. 1919.—This is a rejoinder to RIPPEL's discussion and criticisms (see Bot. Absts. 9, Entry 519).—The rate of growth of organisms is expressed by the differential equation,

$$\frac{dy}{dx} = cy\ (A-y),$$

in which y = the mass of the plant at time x, A = the final (limiting) value of y, and c = a constant. Various methods of integration give equations which express the value of y for any positive value of x. ROBERTSON's equation,

$$\log\frac{x}{A-x} = K\ (t - t_1),$$

gives, for small values of x, values which are larger than the observed, while Mitscherlich's equation,

$$\log\left(\sqrt[n]{A} - \sqrt[n]{y}\right) = \log\ \sqrt[n]{A} - c.x,$$

gives lower values. Somewhat better agreement may be obtained in the case of plant growth if the weight of the seed planted be deducted. Rippels' theory that during the first stage of growth there is some sort of a retarding factor is contradicted. The 2 equations are examined for their ability to express the growth of gourd fruits, *Vicia Faba* roots, peas, and mustard plants.—The somewhat polemical discussion concludes with the statement that Rippel's criticisms in no way invalidate Mitscherlich's previous statements.—*H. S. Reed.*

519. RIPPEL, A. **Die Wachstumkurve der Pflanzen und ihre mathematische Behandlung durch Robertson und Mitscherlich.** [The growth curves of plants and their mathematical treatment according to Robertson and Mitscherlich.] Fühling's Landw. Zeitg. 68: 201–214. 1919.—This is a critical examination of the applicability of formulas proposed by ROBERTSON and by MITSCHERLICH (see Bot. Absts. 9, Entry 517, 518) to the growth of plants. It contains citations to cognate studies, and deals with the rate of growth of root zones, of seedling

leaves, and of flower stalks; the evolution of CO_2 in alcoholic fermentation; and water absorption by plants. There is a discussion of the formula of autocatalysis presented by Robertson,

$$\log \frac{x}{A - x} = K (t - t_1),$$

where x = quantity of substance formed at time t, A = final (limiting) value of x, K is a constant of the reaction, and t_1 is the time at which $x = \frac{A}{2}$. Also, there is consideration of the formula presented by Mitscherlich,

$$\log \left(\sqrt[n]{A} - \sqrt[n]{y} \right) = \log \sqrt[n]{A} - c. x,$$

where y = amount of substance formed at stage x, A = final (limiting) value of y, and n = number of stages. The author concludes that Robertson's formula gives more nearly correct representation of physiological processes than that of Mitscherlich. He discusses sources of error of determinations and necessary precautions. The original should be consulted.—*H. S. Reed.*

MOVEMENTS OF GROWTH AND TURGOR CHANGES

520. ANONYMOUS. [Rev. of: LOEB, JAQUES. **Forced movements, tropisms, and animal conduct.** *209 p., 42 fig.* J. B. Lippincott & Co.: London and Philadelphia, 1918.] Sci. Prog. [London] 14: 167–168. 1919.

521. FYSON, P. F., and K. VENKATARAMAN. **Note on curvature of cut stems of Bryophyllum calycinum.** Jour. Indian Bot. 1: 337–343. *Pl. 2.* 1920.—This paper is inspired by J. LOEB and is an answer to various papers by him on growth in *Bryophyllum calycinum.* [See Bot. Absts. 1, Entries 68, 273, 736; 2, Entries 181, 858, 859.] The authors conclude from experiments conducted in Madras on this plant: That curvature of horizontally supported stems is due to the weight of the stem, and not to the formation of geotropic hormones by any leaves that may remain attached; that root formation by stems bears no apparent relation to the presence or absence of leaves; that the formation of roots from the notches of leaves depends on moisture supply, and not on leaf position; that "neither the stem itself, not the opposite bud, nor the axillary bud, exert any absolute inhibition on the development of the marginal notches, and probably affect it very little"; that root pressure or a developing terminal bud exert no influence on the formation of roots from the notches of attached leaves; and finally that "our observations confirm those of KLEBS on the effect of an excess of water on adventitious root formation."—*Winfield Dudgeon.*

522. PHILLIPS, THOMAS G. **Chemical and physical changes during geotropic response.** Bot. Gaz. 69: 168–178. 1920.—Definite moisture changes accompany geotropic bending in corn nodes. During the early stages of bending there is a greater percentage of moisture in the concave flank. When the process has developed, the percentage of water is greater in the convex flank. Although the titratable acidity is greater in the convex flank, the differences are very slight. The results on hydrogen-ion concentration, although uniform in direction, are not numerous enough to serve as a basis for conclusions. It is impossible, with the data obtained, to correlate the geotropic bending of etiolated *Vicia Faba* shoots with differences in moisture, titratable acidity, hydrogen-ion concentration, catalase activity, or the distribution of sugars and nitrogen-containing substances.—*Thomas G. Phillips.*

523. RICOME, H. **L'orientation des rameaux dans l'espace.** [**The orientation of stems.**] Compt. Rend. Acad. Sci. Paris 171: 734–735. 1920.—This is an addition to a recent article in an earlier number of the same volume in which the author attributes the weight which influences negatve geotropism to the distribution of water in the plant. [See also Bot. Absts. 8, Entry 663.]—*C. H. Farr.*

GERMINATION, RENEWAL OF ACTIVITY

524. Welton, F. A. **Longevity of seeds.** Monthly Bull. Ohio Agric. Exp. Sta. 6: 18–24. 1921.—Brief reference is made to work done by Vilmorin, Haberlandt, and Sifton. Factors affecting the longevity of seed are discussed and reference is made to hard seed. The report in tabular form shows the per cent of viability of the seed of cereals, other grasses, and a few vegetables grown on the station farm at Wooster, Ohio, extending over a period of 12 years.—*R. C. Thomas.*

TEMPERATURE RELATIONS

525. Walster, H. L. **Formative effect of high and low temperatures upon the growth of barley: A chemical correlation.** Bot. Gaz. 69: 97–126. *18 fig.* 1920.—The usual view that the optimum germination temperature is that which most quickly permits the emergence of the radicle and plumule is not accepted, except for the germination function taken by itself. A high temperature and a high nitrogen supply at the time of germination so shift the equilibrium toward excessive vegetation as to prevent the normal tendency toward reproduction. The tendency toward excessive vegetation inaugurated by an excess of nitrate nitrogen accompanying germination and early development at high temperatures cannot be counteracted by the addition of phosphorus or potassium salts. A chemical analysis of the leaf reveals (1) that "high heat supply + high nitrogen supply in nutrient solution = high soluble nitrogen in leaf + low soluble carbohydrate = excessive vegetation and little culm formation," and (2) that "low heat supply + high nitrogen supply in nutrient solution = low soluble nitrogen in leaf + high soluble carbohydrate = normal vegetation and normal culm formation."—*H. C. Cowles.*

RADIANT ENERGY RELATIONS

526. Wurmser, René. **L'action des radiations de différentes longuers d'onde sur l'assimilation chlorophyllienne. [The effect of rays of different wave length on chlorophyll assimilation.]** Compt. Rend. Acad. Sci. Paris 171: 820–822. 1920.—The work is carried out with a new method based on the principles outlined by Loeb and Osterhout. Phenolphthalein was used as an indicator, and experiments were performed with *Ulva lactuca* and *Rhodymenia palmata*. The rate of assimilation in the red, green, and blue respectively was found to be 100, 24, and 80 for *Ulva*, and 100, 50, and 18 for *Rhodymenia*. It thus appears that the red pigment of the Rhodophyceae makes possible the use of green light in photosynthesis.—*C. H. Farr.*

527. Wurmser, René. **L'action de la lumière sur la chlorophylle colloidale en présence de stabilisateurs. [The action of light upon colloidal chlorophyll in the presence of stabilizers.]** Compt. Rend. Soc. Biol. 83: 437–438. 1920.—While chlorophyll is destroyed by light very rapidly when in solution, yet in the plant it is destroyed slowly. By mixing a solution of chlorophyll prepared by the method of Willstätter and Stoll with various colloids this destructive action of light has been greatly retarded, a gelatin solution being the most effective of those tried (gelatin, egg albumin, gum arabic, and starch paste).—*E. A. Bessey.*

TOXIC AGENTS

528. Miège, E. **Action de la chloropicrine sur la faculté germinative des graines. [The effect of chloropicrine on the germinating ability of seeds.]** Compt. Rend. Acad. Sci. Paris 172: 170–173. 1921.—Chloropicrine is found to interfere with the germination of some seeds while not affecting others at ordinary concentrations. Flax is not affected at 15 cc. per cubic meter, but is affected at 50 cc. concentration. Legumes in general are resistant, whereas grasses are sensitive to the gas. About 15–20 cc. per cubic meter is recommended as an insecticide, being used for a period of 24 hours without much injury to any seed.—*C. H. Farr.*

529. Villedieu, M. et Mme. **De la non-toxicité du cuivre pour les moisissures en général et pour le mildou en particulier.** [**The non-toxicity of copper for molds in general and for mildews in particular.**] Compt. Rend. Acad. Sci. Paris 171: 737–739. 1920.—Most ordinary molds may be cultivated in 1, 2, 5, or 10 per cent solutions of cuproammonium citrate, a salt which is slightly acid, very soluble in water, and contains 15 per cent metallic copper. *Penicillium* lives well in nutritive agar saturated with this salt. The toxic action of copper sulphate is found to be due entirely to the free sulphuric acid produced in solution. *Phytophthora infestans* will grow in solutions of copper ammonium citrate up to a strength of at least 0.1 per cent.—*C. H. Farr.*

530. Wieler, A. **Rauchschaden bei Kokereien.** [**Smoke injury from coke ovens.**] Jahresber. Ver. Angew. Bot. 16: 64–76. 1918.—The author finds considerable injury from fumes of coke ovens within a radius of a kilometer, extent of injury varying with distance from ovens, direction from ovens, intervening barriers, etc. Different plants vary greatly with regard to their susceptibility to injury—legumes, roses, and potatoes suffering more than other crops. The character of the injury is very different from that of the acid injuries produced by sulphur fumes, and the writer does not believe that sulphur is responsible in this case. He indicates rather that some basic compounds of the anthracene-oil fraction and possibly ammonia are the toxic substances, although this phase needs further investigation. No method of prevention has been found.—*P. J. Anderson.*

ELECTRICITY AND MECHANICAL AGENTS

531. Peck, J. L. **Les différences de potential en biologie.** [**Differences of potential in biology.**] Compt. Rend. Soc. Biol. 83: 282–283. 1920.—A growing carrot plant removed from the soil and placed with its roots in water up to the middle showed a difference in potential between leaves and water of about 4 volts. Under the influence of ultra-violet rays this increased to 8 volts and became zero on adding to the water 10 drops of HNO_3 per 100 gm. water. Further experiments with animal tissues showed a difference in potential between muscles and blood, or between muscles and water, into which they were placed. These were increased by ultra-violet light or some toxins. The absorption of water by the muscles shows a close relation to the potential differences between the water and muscle.—*E. A. Bessey.*

SOIL SCIENCE

J. J. Skinner, *Editor*
F. M. Schertz, *Assistant Editor*

(See also in this issue Entries 11, 25, 27, 32, 34, 57, 100, 107, 112, 203, 208, 402, 437, 452, 480, 574)

532. Aiyer, A. R. Padmanabha, and D. V. Bal. **The chemical and biological aspect of Bhata soil of Chandkhuri experimental farm, Central Provinces.** Agric. Jour. India 15: 644–649. *Pl. 46–50.* 1920.—The Bhata or lateritic soils of Central Provinces were found to be poor on account of the large per cent of coarse material they contained and to a lack of phosphorus. The addition of phosphorus improved the soil for the growth of leguminous crops. The soil has good ammonifying and nitrifying powers. When cake was applied and inoculated with emulsion of a rich black cotton soil, good growth was secured.—*J. J. Skinner.*

533. Albrecht, W. A. **Bat guano and its fertilizing value.** Missouri Agric. Exp. Sta. Bull. 180. *15 p.* 1921.—Chemical analyses of bat guano and pot and field experiments with this material as a fertilizer are reported. The material, which is commonly found in caves in Missouri, is said to have considerable value as a fertilizer, its nitrogen content varying from 0.31 to 10.44 per cent, phosphoric acid 2.5 to 7.9 per cent, and potash 0.36 to 1.9 per cent. In ammonification tests fresh bat guano produced as much ammonia and more nitrates than

tankage but did not equal dried blood. In pot cultures bat guano gave better results than dried blood, tankage, or ammonium sulphate, and in field tests with oats it also proved superior to ammonium sulphate. Because of its relatively high nitrogen content and because of its light weight when dry it is recommended primarily for mixture with other fertilizers.—*L. J. Stadler.*

534. Baguley, A. **Building up the fertility of the soil.** Jour. Dept. Agric. Union of South Africa 1: 755–759. 1920.—A general discussion of improving soil fertility by means of humus, lime, and fertilizers.—*J. J. Skinner.*

535. Bouyoucos, George B. **A new classification of soil moisture.** Soil Sci. 11: 33–47. 1921.—On the basis of freezing point determination of soil of various types and water contents and determinations of the per cent of water which freezes in soils at different temperatures as determined by the use of the dilatometer, the soil water is classified as gravitational, free (water which freezes for the first time at a supercooling of −1.5°C.), capillary adsorbed (water which freezes at the supercooling of −4°C.), and combined water, which does not freeze even at −78°C. The capillary-adsorbed and combined water are called unfree.—*W. J. Robbins.*

536. Bouyoucos, George B. **The concentration of the soil solution around the soil particles.** Soil Sci. 11: 131–138. 1921.—The concentration of the soil solution in intimate contact with the surface of the soil particles is less than that of the mass of the soil solution. This is indicated (1) by the diminution of the freezing-point lowerings of soils by successive freezing and thawing; (2) by the liberation of unfree water from soils, by successive freezing and thawing; (3) by the abnormally greater increase in the freezing-point depression of soils as the moisture content decreases; and (4) the equality in the freezing-point lowering between the supernatant liquid and the soil which bathes it.—*W. J. Robbins.*

537. Davis, R. O. E. **Atmospheric nitrogen for fertilizer.** U. S. Dept. Agric. Yearbook 1919: 115–123. 1920.—The sources of natural nitrogen fertilizer supply are shown to be inadequate to meet the increased future demands. The desirability of a method of utilizing the atmospheric nitrogen was emphasized. A discussion of the practicality of 5 principal methods for conversion of atmospheric nitrogen into available fertilizer compounds showed that the Haber and the cyanamid processes were the only ones adapted to use in the U. S. A. at present.—*C. J. Shirk.*

538. Espe, Knute, and Lawrence E. Lindley. **Soil survey of Hamilton County, Iowa.** Advance Sheets Field Operations Bur. Soils, U. S. Dept. Agric. 1917: 5–30. *Fig. 1 and map (colored).* 1920.—Hamilton County is situated in the north central part of Iowa in a prairie region. The prevailing flat topography is intercepted by the precipitous slopes of Boone River and by morainic ridges. The general elevation is between 1,100 and 1,200 feet above sea level.—Drainage within the county as a whole is imperfect.—The mean annual precipitation is 34.55 inches. The normal growing season is 146 days.—Agriculture, which is the principal industry in Hamilton County, consists mainly in the production of corn, small grain, and hay combined with the raising and feeding of hogs and other live stock. Corn is the main crop.—The soils of the county are glacial in origin, in appearance they are predominantly dark. Large poorly drained areas occur. In great part the soils of the county are calcareous, alluvial soils are inextensive. Eroded strips bordering the stream valleys are characterized by light brown to gray surface soils. Such areas are for the most part forested and originally were all forested. Peat and muck occur in shallow and basin-like areas representing former ponds or lakes. Small areas of alkaline soils occur in the swales, ponds, or sloughs that have recently been drained. Corn is most susceptible to injury from the alkali. Drainage is the chief factor in correcting the alkaline condition.—Improved land constitutes 90–95 per cent of the County. The average size of farms is about 179 acres.—*F. B. Howe.*

539. Geib, W. J., Clarence Lounsbury, and Martin O. Tosterud. **Soil survey of Waupaca County, Wisconsin.** Advance Sheets Field Operations Bur. Soils, U. S. Dept. Agric.

1917: 5–50. *Fig. 1 and map (colored).* 1920.—Waupaca County is situated in the east central part of Wisconsin in a glaciated region. The topography varies from level to rolling or hilly, the ruling elevation of the county being 848 feet above sea level.—The county lies within the drainage basin of Wolf River. Numerous marsh areas and lakes are found in the county.—The mean annual precipitation is 31.62 inches, a large proportion of which occurs during the growing season, which averages 129 days. Early frosts are frequent on the marsh areas.—Agriculture consists in general farming, potatoes are an important crop on the sandy soils.—Large areas of unclaimed peat are found in the county. The depth of the peat varies from a shallow phase of 18 inches or less to 3 feet or more below the surface. Vegetation on peat consists of coarse marsh grasses, sedges, and sphagnum moss on open marshes, with willow, alder, some poplar, and tamarack in timbered tracts. Peat when reclaimed is adapted for potatoes, cabbage, celery, onions, and other garden truck. The Gloucester soils, one of the most important and extensive series in Waupaca County, especially in the western half, are derived through glacial action from crystalline rocks, and are mainly sandy in texture. The original forest growth was chiefly hardwoods, including maple, oak, birch, and some elm, with varying amounts of white and Norway pine. On the Gloucester sand the original timber growth consisted of scrubby oak and some white pine. The Kewaunee series and Superior series are partly lacustrine in origin; they are characterized by heavy clay subsoils. The original timber growth on these soils consisted of maple, oak, elm, hickory, some walnut, and varying amounts of pine. The Whitman series and the Poygan series are poorly drained upland soils which in their native state supported a growth of elm, ash, willow and alder, together with coarse grasses and other moisture-loving vegetation. Alluvial soils deposited as outwash plains consist of the Plainfield series and Merrimac series. Other alluvial soils such as the Genesee series and the Dunning series are subject to overflow where they occur adjacent to stream courses. The average size of farms is approximately 110 acres.—*F. B. Howe.*

540. Gerlach. **Die Kohlensäureernährung der Pflanzen und der Stalldünger. [Carbonic acid nutrition of plants and stable manure.]** Mitteil. Deutsch. Landw. Ges. 36:147–150. 1921.—This is a general review of the controversy between Bornemann and Lemmerman in which the author brings forth data from previous experiments to show that Bornemann greatly overrated the effect of carbonic acid produced by the decay of stable and green manures. Gerlach finds that the carbonic acid thus produced has no effect on crop yields. [See also Bot. Absts. 8, Entry 12, 32.]—*A. J. Pieters.*

541. Harrison, J. B., and C. B. W. Anderson. **The genesis of a fertile soil.** West Indian Bull 18: 77–98. 1920.—This paper comprises a study of the origin and development of the fertile sugar-cane soils of the island of Barbados, West Indies. Historical and analytical data are given, and the theory of the origin of the soils is discussed.—*J. S. Dash.*

542. Hudelson, R. R. **Keeping soils productive.** Missouri Agric. Exp. Sta. Circ. 102. *24p.* 1921.—A brief popular discussion of the essentials in the maintenance of soil fertility.—*L. J. Stadler.*

543. Hudig, J., en W. Sturm. **Het meten van waterstof-ionenconcentraties en bodenextracten en bodensuspensies. [Measurement of hydrogen-ion concentrations in soil extracts and soil suspensions.]** Verslag. Landbouwk. Onderzoek. Rijkslandbouwproefsta. 25: 85–127. 1919.—With the V-electrode no reliable measurements of soil extracts from sand-containing peat could be made, as the potential constantly changes. Through proper disinfection it was demonstrated that this could not be attributed to action of soil bacteria. A new electrode was constructed through which hydrogen could be conducted, the soil and liquid meanwhile being constantly in contact.—Hydrogen-ion concentration of a soil suspension depends upon (a) temperature, (b) quantity of liquid and soil, (c) time of penetration, (d) treatment, such as shaking, (e) addition of salts. The season also has an influence.—*J. C. Th. Uphof.*

544. Juritz, C. F. **Calcium cyanamide. Its agricultural use as a fertilizer.** Jour. Dept. Agric. Union of South Africa 1: 765–769. 1920.—A review of experiments with cyanamide is given. Under certain conditions of storage, dicyanamide is formed which is harmful to plants; its poisonous action is discussed. From the experiments cited the productive value of cyanamide is lower than that of nitrate of soda or sulphate of ammonia.—*J. J. Skinner.*

545. Kelley, W. P., and A. B. Cummins. **Chemical effect of salts on soils.** Soil Sci. 11: 139–159. *Fig. 1–7.* 1921.—A comparison was made between the analyses of the filtrate from a given soil after being treated with distilled water or with solutions of various salts. Chemically equivalent solutions of the chlorides, sulphates, and nitrates of a given base produced substantially equivalent chemical reactions in the soils studied. An exchange of bases took place with the result that a portion of the base of the added salt passed out of solution and a chemically equivalent amount of other bases was set free from the soil silicates; calcium is the base most easily replaced in the soils used. Considerable amounts of phosphate were precipitated by the soils. The reactions between neutral salts and soils are dependent upon the concentration and apparently obey the principle of mass action.—*W. J. Robbins.*

546. Lipman, J. G. **New Jersey's experience with fertilizers.** Potato Mag. 3[9]: 7, 28, 30. *1 fig.* 1921.

547. Lipman, J. G., A. W. Blair, W. H. Martin, and C. S. Beckwith. **Inoculated sulfur as a plant-food solvent.** Soil Sci. 11: 87–92. 1921.—The crop yields on field plots to which inoculated or uninoculated sulphur alone or with greensand marl or rock phosphate were added indicate that inoculated sulphur is more effective in rendering inert mineral plant food accessible to growing crops than uninoculated sulphur.—*W. J. Robbins.*

548. Marchand, B. de C. **Representative Transvaal soils. The Koedoespoort red loam. I.** Jour. Dept. Agric. Union of South Africa 1: 722–727. 1920.—Fertilizer experiments show that this soil is improved by the addition of phosphates, especially basic slag. Potash and nitrogen do not increase the productivity of the soil. Chemical analyses of a number of samples are given and show the soil to be rich in iron and aluminum.—*J. J. Skinner.*

549. Maschhaupt, J. G. **De invloed van grondsoort en bemesting op het gehalte onzer landbouwgewassen aan stikstof en aschbestanddeelen VII. [The influence of kind of soil and fertilizer upon nitrogen and ash content of agricultural crops VII.]** Verslag. Landbouwk. Onderzoek. Rijkslandbouwproefsta. 23: 40–56. 1919.

550. Osbon, C. C. **Peat in the Dismal Swamp, Virginia and North Carolina.** U. S. Geol. Surv. Bull. 711[c]: 41–59. *3 pl.* 1919.—The Dismal Swamp covers approximately 2,200 square miles, of which a little more then 700 have been drained to a depth of 3 feet or more by the Dismal Swamp Canal and smaller ditches. Much of the drained land is farmed. In the remaining 1500 square miles peat deposits ranging in depth from 1 to 20 feet are found. The thickest beds lie in the region east and northeast of Lake Drummond, where peat 18 feet deep was exposed by comparatively recent excavations. The peat in this area is black and low in inorganic impurities and is probably the best in the swamp. In general, the depth of the peat gradually decreases toward the edge of the swamp, where the peat finally merges into the sands of the adjoining areas. It is estimated that the average thickness of the peat is 7 feet and the total available peat in the Dismal Swamp 672,000,000 tons. The peat deposits lie in shallow basins that originated in an extensive depression of the Columbia group of formations.—*J. J. Skinner.*

551. Scheringa, K. **Is chemische denitrificatie van belang voor den landbouw en voor het water onderzoek? [Is chemical denitrification important for agriculture and the examination of water?]** Pharm. Weekbl. 57: 1481–1483. 1920.—Some nitrogenous substances, such as the diazo compounds, easily give off nitrogen on account of the indifferent properties of the latter. Some years ago Marpmann claimed that nitrogen can be liberated from nitroge-

nous substances without the aid of bacteria. Nitrites act on ammonia with the liberation of nitrogen; this action is increased when certain substances like aniline dyes, especially malachite green, fluorescin, or methyl red are present, while it is retarded, and even inhibited, in the presence of colloidal substances. Since well water contains quite a number of organic substances, which act as protective colloids, the simultaneous presence of ammonia and nitrites can be explained. Sterile soil acts like colloids. Some loss of nitrogen may occur in manure, but this loss in only a very slight one.—*H. Engelhardt.*

552. Sen, J. **Report of the Imperial Agricultural Chemist.** Sci. Rept. Agric. Res. Inst. Pusa 1919-20: 31-45. 1920.—An examination of soils of the Pusa farm to determine the effect of various fertilizers alone and in combination on permanent soil fertility leads to the conclusion that "the outstanding feature is the value of a combination of green manure and superphosphate."—Experimental evidence shows that superphosphate is held in calcareous soils by chemical combination, and, since the reaction goes on rapidly, the phosphate is restricted to surface layers of the soil. It is held in noncalcareous soils by adsorption, hence is widely and uniformly distributed through such soil, and is more available for use by the roots of growing plants. "The distribution of the phosphoric acid of those soluble phosphates which are without action on calcium carbonate, through a column of soil is of a uniform type even in highly calcareous soils, and the phosphoric acid penetrates to a considerable depth," suggesting that "such phosphates would be more efficacious than superphosphates in calcareous soils."—Under laboratory conditions, pieces of sugarcane with the cut ends sealed with paraffin, and kept in desiccators, showed slight increase in sucrose content; subsequent wetting causes a fall in sucrose content; these sucrose transformations are similar to those observed in cane windrowed under field conditions and are believed to be closely connected with enzymatic activity.—Repetition of water culture experiments indicates that poor results from cultures previously reported (Pusa Memoir Vol. II, No. 3, Botanical Series) were due to excessive concentration of the nutrient solutions, and not to the excretion of specific toxic substances by the roots.—Periodic analysis of the soil air in a mixed orchard showed the largest CO_2 content in a grassed plot, an intermediate amount in a grassed plot aerated by means of trenches, and least in a plot under surface cultivation. The percentage of CO_2 attains a maximum during the summer monsoon.—In manurial experiments with rice, ammonium sulphate along with phosphates gave increasing yields up to 160 pounds per acre, after which there was a decrease, till with 320 pounds per acre the yield was little better than with no nitrogen at all. Smaller applications of nitrogen increased the proportion of straw to grain; 80-160 pounds per acre gave maximum proportion of grain, and is therefore the most economical application. Green manure alone increased the crop up to 65 per cent, but in combination with ammonium sulphate had little effect. Ammonium sulphate produced an increase in the amount of nitrogen in the grain almost proportional to the amount of sulphate added as fertilizer.—*Winfield Dudgeon.*

553. Shedd, O. M. **A short test for easily soluble phosphate in soil.** Soil Sci. 11: 111-122. 1921.—A test requiring less than 1 hour to complete is described for testing for easily soluble phosphate in soils. The relative amounts of precipitates are taken to indicate the need of the soil for phosphorous.—*W. J. Robbins.*

554. Stead, Arthur. **The agriculture and soils of the Cape Province, IV and V. Witkop-Burghersdorp.** Jour. Dept. Agric. Union of South Africa 1: 660-670, 819-828. 1920.—Soils from a number of farms in the province were analyzed chemically and mechanically; their fertility is discussed.—*J. J. Skinner.*

555. Tottingham, W. E., and E. B. Hart. **Sulfur and sulfur composts in relation to plant nutrition.** Soil Sci. 11: 49-73. *Pl. 1-4, fig. 1-2.* 1921.—The changes in acidity, citrate-soluble and water-soluble phosphate, bacterial numbers, and the effects on crop yields of composts of soil or manure with sulphur or with sulphur and horse manure showed appreciable increase in acidity but no increase in citrate-soluble phosphate after 15 weeks. Sulphur

composts of manure decreased the loss of organic matter by fermentation although increased bacterial numbers were maintained. Citrate-soluble phosphate approximately doubled where sulphur was added. On Plainfield sandy loam the yield of oats was as great where sulphur compost was applied as where the treatment included rock phosphate. In greenhouse trials sulphur increased the yield of clover and of the Cruciferae and in field plots increased the yield of seed in barley. Sulphur appears to function as a fertilizer both by oxidation to the nutrient sulphate and by producing an acid condition favorable to the production of available phosphate. It remains to be proved whether the efficiency of sulphur is any greater when it is composted with rock-phosphate and manure than when these materials are added simultaneously to the soil.—*W. J. Robbins.*

556. Walton, J. H. **Report of the Imperial Agricultural Bacteriologist.** Sci. Rept. Agric. Res. Inst. Pusa 1919–20: 109–113. 1920.—A report of progress in the study of (1) nitrification of cow and sheep manures and various oil cakes, both in pot cultures and field plots, and (2) the nitrogen fixing power of various soil microorganisms.—*Winfield Dudgeon.*

557. White, J. W. **Lime requirement of Pennsylvania soils.** Pennsylvania Agric. Exp. Sta. Bull. 164. *36 p., 6 fig.* 1920.—This bulletin is a summary of a lime-requirement survey of Pennsylvania. The results are discussed in terms of $CaCO_3$, or limestone required in pounds per acre to produce an alkaline soil to the depth of 7 inches as determined by the Veitch method. The survey includes a study of 1474 samples of soil taken from 50 counties and represents all of the soil series of agricultural importance. Seventy-two per cent of the soil areas in Pennsylvania were found to be acid, while 85 per cent of the river bottom soils of the state were acid. The average lime requirement of limed soils was found to be 1,749 lbs. per acre as compared to 3,105 lbs. where no lime had been used. No definite relation exists between the lime requirement and the texture of the soils.—The growth of clover and alfalfa in relation to the lime requirement of Pennsylvania soils is shown in the table.

SOIL SERIES	COUNTIES	AVERAGE LIME REQUIREMENT IN LBS PER ACRE	PER CENT ACID SOILS	AVERAGE TONS PER COUNTY, 1909	
				Clover	Alfalfa
DeKalb	Jefferson, Clearfield, McKean, and Venango	3993	87	22	411
Westmoreland	Greene, Washington, Beaver, and Allegheny	3149	77	93	596
Southeastern Soils	Berks, Chester, Lancaster, York, and Lehigh.	460	25	527	3764

A classification of the important soil series of the state is included.—*C. R. Orton.*

558. Wilson, B. D. **Nitrogen in the rain-water at Ithaca, New York.** Soil Sci. 11: 101–110. 1921.—With an average yearly rainfall of 29.31 inches between May 1, 1915, and May 1, 1920, the soil received annually 12.51 lbs. of nitrogen per acre. Of this amount 11.5 lbs. was in the form of ammonia and 1.01 in the form of nitrates. The rainfall during the spring and summer contained more nitrogen than that of the fall and winter.—*W. J. Robbins.*

TAXONOMY OF VASCULAR PLANTS

J. M. Greenman, *Editor*

E. B. Payson, *Assistant Editor*

(See in this issue Entries 14, 86, 113, 233, 234, 345, 380, 461)

MISCELLANEOUS, UNCLASSIFIED PUBLICATIONS

B. E. LIVINGSTON, *Editor*

SAM F. TRELEASE, *Assistant Editor*

559. ANONYMOUS. [Rev. of: GISSING, F. T. **Peat industry reference book.** *xxiv + 292 p.* Charles Griffin and Co.: London, 1920.] Nature 106: 594. 1920.—The book deals with developments in the industry which have arisen since publication of other books on the subject by the same author. The chief defect of the book is in the description of various processes from the point of view of inventors or exploiters.—*O. A. Stevens.*

560. ANONYMOUS. [Rev. of: HENDERSON, I. F., AND W. D. **A dictionary of scientific terms: Pronunciation, derivation, and definition of terms in biology, botany, zoology, anatomy, cytology, embryology, physiology.** *viii + 354 p.* Oliver and Boyd: Edinburgh and London, 1920.] Nature 106: 498–499. 1920.

561. ANONYMOUS. **Natuurmonumenten in Ned. Indië.** [**Nature monuments in Dutch East India.**] Aarde en haar Volkeren 57: 28. 1921.—The Government of Dutch East India has added 7 new areas to be reserved as natural monuments, making altogether 62. Important ones are in the district of Bandjarnegara, where some rare trees, such as *Palaquium Ottolanderi* and *Firminia colorata,* are protected. The Governor of Atjeh has been asked to take steps in the district of Serbadjadi for the protection of *Rafflessia Arnoldi.*—*J. C. Th. Uphof.*

562. ANONYMOUS. **Steigerung des landwirtschaftlichen Ertrages durch Hochofenabgase.** [**Increasing yields by use of furnace gases.**] Fortwiss. Centralbl. 42: 382. 1920.—This article gives data from a paper in the Frankfurter Zeitung Supplement for March 6, 1920, regarding experiments by RIEDEL in fertilizing various crops with purified furnace gases, in which the beneficial substance is CO_2. It is estimated that a daily output of 1,000 tons of iron produces enough CO_2 gas to grow 4,000 tons of crops like potatoes, and that enough gas is going to waste in Germany to supply the whole agricultural need.—*W. N. Sparhawk.*

563. BEREK, M. **Über die einfachen und zusammengesetzten charakteristischen Konstanten der Mikroskopobjektive.** [**Simple and compound characteristic constants of the objective.**] Zeitschr. Wiss. Mikrosk. 37: 36–41. 1920.

564. BRENCHLEY, W. E. **The uses of weeds and wild plants.** Sci. Prog. [London] 14: 121–133. 1919.—Weeds and wild plants are used quite extensively in some countries for human food, fodder, fibers, fuel, manures, drugs, dyes, and for miscellaneous purposes.—*J. L. Weimer.*

565. FYSON, P. F. **Editorial retrospect.** Jour. Indian Bot. $1^{9,10}$: [Unpaged insert.] May, 1920.—The success of the 1st year of the Journal of Indian Botany has justified the belief that such a publication is needed in India.—*Winfield Dudgeon.*

566. GROFF, ELIZABETH H. **Soy-sauce manufacturing in Kwantung, China.** Philippine Jour. Sci. 15: 307–316. *7 pl.* 1919.—A description is given of the plant, utensils, and methods of preparation of sauce from soy beans, flour, salt, and water.—*Albert R. Sweetser.*

567. HOUSE, HOMER D. **The wild flower preservation idea is one of practical value.** Torreya 21: 17–21. *2 fig.* 1921.—Conservation is necessary, not only of our economic resources but also of those having recreational value. The destruction of plant life causes great damage to animal life also, and makes possible the introduction of noxious weeds. Many of our most beautiful wild flowers are becoming rare as the result of heedless destruction. Education along this line is needed, and the establishment of wild-life reserves is urged.—*J. C. Nelson.*

568. MACKENNA, J. **Proceedings of the Board of Agriculture in India.** 1919. *129 p., 1 pl.* Pusa, 1920.—A report of the deliberations at the 11th biennial meeting of the Imperial,

Provincial, Native State and other agriculturists composing the Board of Agriculture in India. Among the subjects discussed are: Necessity for investigation into the conditions of nitrogen fixation in Indian soils; the maintenance of soil fertility under improved methods of agriculture; the advisability of the Agricultural Department undertaking to prepare popular bulletins describing improved methods of agriculture, and school readers containing lessons on agriculture; the conservation of by-products for fertilizer, from various industries; and the permanent experimental plots at the Agricultural Research Institute, Pusa.—*Winfield Dudgeon.*

569. Mackenna, J. **Annual report on the progress of agriculture in India, 1917–18.** *324 p., 4 pl.* Pusa, 1919.—Annual reviewof agriculture throughout British India,by the Agricultural Adviser to the Government of India. Covers much the same ground as the 1918–19 report (see Bot. Absts. 9, Entry 570).—*Winfield Dudgeon.*

570. Mackenna, J. **Annual report on the progress of agriculture in India, 1918–19.** *186 p., 4 pl.* Pusa, 1920.—Annual review of agriculture throughout India, by the Agricultural Adviser to the Government of India. It covers, among other agricultural topics: Agricultural conditions of the year. Scientific research in the agriculture and botany of rice (*Oryza sativa*), wheat (*Triticum vulgare*), cotton (*Gossypium* spp.), sugarcane (*Saccharum officinarum*), fiber plants, indigo (*Indigofera tinctoria*), tobacco (*Nicotiana tabacum*), linseed (*Linum usitatissimum*), sesamum (*S. indicum*), groundnut (*Arachis hypogea*), coconut (*Cocos nucifera*), castor (*Ricinus communis*), tea (*Camellia thea*), coffee (*Coffea arabica*), rubber, fruits, fodder-crops and grasses, potatoes (*Solanum tuberosum*), gram (*Cajanus indicus*), poppy (*Papaver somniferum*), barley (*Hordeum vulgare*), and beans (*Phaseolus lunatus*). Agricultural chemistry of soils, manures, sugarcane storage, indigo manufacture, and miscellaneous. Mycology and plant pathology,—diseases of rice, jute, sugarcane, chillies (*Capsicum* spp.), legumes, tea, coffee, rubber (*Hevea brasiliensis*), palms (*Borassus flabellifer* and *Areca catechu*), and miscellaneous. Agricultural bacteriology,—nitrification, green-manuring, nitrogen fixation, indigo manufacture, pebrine of silkworms, and sterilization of water. Agricultural demonstration and cooperation. Agricultural education. Among the appendices are lists of agricultural stations, agricultural colleges and schools, and of 143 agricultural publications in British India for 1918-19. [See also Bot. Absts. 9, Entry 569.]—*Winfield Dudgeon.*

571. Merk, L. **Das Bezeichnen und Wiederfinden beachtenswerter präparatestellen. [Marking and relocating of important points on slides.]** Zeitschr. Wiss. Mikrosk. **37**: 42–45. 1920.

572. Metz, C. **Apertometer für Trockensysteme und Ölimmersionen. [Apertometer for dry systems or oil immersion.]** Zeitschr. Wiss. Mikrosk. **37**: 53–54. 1920.

573. Metz, C. **Der makroskopische Zeichenapparat. [Macroscopic drawing apparatus.]** Zeitschr. Wiss. Mikrosk. **37**: 55–58. 1920.

574. Milligan, S. **Review of agricultural operations in India. 1919–20**: 1–140. *3 pl.* 1921.—This is the annual report of the Agricultural Adviser to the Government of India. Previous reports have appeared under the title "Progress of Agriculture in India." The report gathers together and summarizes the work of the imperial and local provincial agricultural departments during the year under review, and deals with: Agricultural conditions of the year; economic work on the more important crop plants; research and investigation in soils, fertilizers, windrowing of sugar cane, prussic acid in *Andropogon sorghum*, diseases of crops, insect pests, useful insects, and miscellaneous; agricultural engineering; district work; agricultural education; the cooperative movement as affecting agriculture; diseases, inoculation, and breeding of live stock, and veterinary education and research; publications of the imperial and provincial agricultural departments; and expenditure on the various agricultural departments. In 6 appendices are given special data for the year: A list of the agricultural stations in British India; a list of the agricultural colleges; operations of non-credit agricultural co-

operative societies; working of provincial civil veterinary departments; students in the veterinary colleges and schools; and a list of 153 publications put out by the various agricultural departments during the year.—*Winfield Dudgeon.*

575. Milligan, S., and G. S. Henderson. **Report of the Director.** Sci. Rept. Agric. Res. Inst. Pusa 1919–20: 1–9. 1920.—The report includes a statement of the staff in charge; a brief summary of the scientific work undertaken in various sections of the Institute; and a statement concerning the publications from the Institute during the course of the year under review.—*Winfield Dudgeon.*

576. Schmehlik, R. **Polarisation im binokularen Instrument. [Binocular polarization.]** Zeitschr. Wiss. Mikrosk. 37: 136–137. 1920.

IX SEPTEMBER, 1921 No. 2
ENTRIES 577–1100

BOTANICAL ABSTRACTS

A monthly serial furnishing abstracts and citations of publications in the international field of botany in its broadest sense

PUBLISHED MONTHLY UNDER THE DIRECTION OF

THE BOARD OF CONTROL OF BOTANICAL ABSTRACTS, INC.

A democratically constituted organization, with members representing many societies interested in plants

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CONTENTS.

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J. R. SCHRAMM, Editor-in-Chief
Cornell University, Ithaca, New York

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AGRONOMY

C. V. PIPER, *Editor*
MARY R. BURR, *Assistant Editor*

(See also in this issue Entries 735, 873, 911, 916, 931, 941, 959, 961, 966, 1009, 1030, 1050, 1051, 1069, 1070, 1086)

577. ANONYMOUS. **Destrucción de las malas yerbas.** [Weed destruction.] Rev. Agric. [Mexico] 4: 414–415. *3 fig.* 1919.—Popular.—*John A. Stevenson.*

578. ANONYMOUS. **Emparve de trigos.** [Stacking of wheat.] Defensa Agric. [Uruguay] 1: 309–315. *5 fig.* 1920.—Taken from Bull. 34 Inspección Nacion. Ganaderia y Agric. Uruguay.—*John A. Stevenson.*

579. ANONYMOUS. **Flax cropping.** North Dakota Agric. Exp. Sta. Ext. Circ. 44. *4 p.* 1921.—A popular treatment of the subject is presented.—*L. R. Waldron.*

580. ANONYMOUS. **Home grown wheat.** Nature 107: 89–90. 1921.—Increase of yield is much needed and is to be sought by use of improved varieties and fertilizers. Experiments seem to favor fall sowing.—*O. A. Stevens.*

581. ANONYMOUS. **Local results with Glencope wheat.** Agric. Gaz. New South Wales 32: 248. 1921.—Glencope wheat was originated by Mr. Cope in South Australia. Trial at Temora showed it to be comparatively low yielding.—*L. R. Waldron.*

582. ANONYMOUS. **Plantas forrajeras.** [Forage plants.] Informacion Agric. [Madrid] 11: 140–142. *3 fig.* 1921.—*Trifolium pratense*, *T. hybridum*, and *Brassica napus* (colza or rape) are recommended as forage crops.—*John A. Stevenson.*

583. ANONYMOUS. **That early blooming sweet clover.** Amer. Bee Jour. 61: 142–143. 1921.—A description is given of an early-blooming variety of white sweet clover (*Melilotus alba*). It is reported to mature its seed 3 weeks before the common white form. It grows to a good height, ripens before the weeds, is a heavy seed producer, is a superior soil improver, and is usually hardy.—*J. H. Lovell.*

584. ANONYMOUS. **Une nouvelle plante pour l'engrais vert.** [A new green manure plant.] Jour. Sta. Agron. Guadeloupe 1[1]: 14–15. 1920.—A field test with *Sesbania sericea* DC. as a green manure crop is briefly described. A chemical analysis of the crop is reported and the trial planting is said to have yielded at the rate of 117.74 lbs. of nitrogen per acre.—*J. D. Luckett.*

585. Ahr, und Chr. Mayr. **Grundlagen der Wiesen-Düngung. [The fundamentals of fertilizing meadows.]** *159 p.* F. P. Datterer & Cie.: Freising, 1919.—Meadows furnish the greater part of the winter feed in Bavaria. Among the chief means for securing increased yields is the application of fertilizers, and the authors give in the first 87 pages an account of the fertilizer experiments carried on from 1912 to 1916 with nitrogen, phosphoric acid, and potash in different combinations and from different sources. It was found that the use of commercial nitrogenous fertilizers did not pay. When a meadow was properly supplied with lime, potash, and phosphate the yields were as good, and the amounts of nitrogen in the hay as high, as when commercial nitrogen was used.—In the 3rd and 4th sections, the authors discuss the fertilizer utilization and the fertilizer balance in the fertilizing of meadows as well as how to determine the manurial requirements, in which analyses of the hay for potash and phosphorus content can be very helpful. The authors quote with approval the statement of Paul Wagner that if the hay contains in the vicinity of 2 per cent potash or around 0.65 per cent phosphoric acid, further applications of these substances will not increase yields; but they call attention to important limitations in the application of this conclusion. Not only must the chemical analysis be constantly checked by a botanical determination of the species occurring and a separation of these into grasses, clovers or other legumes, and herbs, but the previous conditions of the meadow must be taken into account. Further care must be taken that the material for chemical analysis be carefully selected from the freshly cut meadow and not from the hay after it has been exposed to the weather.—*A. J. Pieters.*

586. Ahr, J., und Chr. Mayr. **Düngungseinflüsse auf Ertrag und Güte von Gerstensorten. [Influence of fertilizer on yield and quality of barley varieties.]** *124 p.* F. P. Datterer & Cie.: Freising, 1919. Two years' results of pot tests of various fertilizers on different varieties of barley are reported. Six varieties of barley were used, as follows: 2 selections of Upper Bavarian, a Lower Bavarian, a Danubian, a 4th Bavarian and a Lower Frankish. Each of these received 10 different treatments: Unfertilized; single applications of nitrogen, phosphorus, potash, or lime; application of pairs of fertilizers, nitrogen and phosphorus, nitrogen and potash, and potash and phosphorus; complete fertilizer with lime; complete fertilizer without lime.—The plants showed a strong reaction to nitrogenous and phosphatic fertilizers. Nitrogen alone, while it stimulated culm production and increased yield, was not a satisfactory fertilizer as the quality of the grain was not good. Phosphorus and potash without nitrogen gave a good quality of grain, but the yield was greatly increased and the quality remained good when nitrogen and lime were added. Too much nitrogen is not desirable from the Bavarian point of view. The smaller kernels were highest in nitrogen, the larger highest in starch.—*H. V. Harlan.*

587. Amend, Friedrich Wilhelm. **Untersuchungen über flämischen Roggen unter besonderer Berücksichtigung des veredelten flämischen Landroggen und seiner Züchtung. [Investigations of Flemish rye with special reference to the improved Flemish "land" rye and its breeding.]** Landw. Jahrb. 52: 615–670. 1919.—The small farmers of West Flanders have developed through selections in the old Flemish "land" rye, a new variety, which, while retaining the good qualities of the old, is improved in yielding ability, kernel weight, resistance to lodging, and ratio of grain to straw. Studies of the original and the improved sorts show that clubheadedness is correlated with density of heads and shorter kernels, but not with green color of kernels. Length of head is positively correlated with kernel weight and negatively with density. The short dense head shows slightly more sterility than the more loosely formed head. Kernel color and kernel quality are closely related, green color being preferable to brown. Form of head and culm development are closely related, short heads, each with a short peduncle, generally accompanying short culms. The degeneration of foreign ryes in Flanders is due to the maritime climate, which interferes with normal development.—*C. E. Leighty.*

588. Ames, C. T. **Cotton experiments at the Holly Springs Branch Experiment Station seasons of 1919 and 1920.** Mississippi Agric. Exp. Sta. Bull. 192. *10 p.* 1920.—Results from variety tests on hill and valley land, fertilizer tests, and cotton spacing experiments are given;

lso, certain suggestions in regard to cotton culture in the brown loam belt of north Mississippi. Cleveland, Miller, and Triumph are recommended for hill, and Wannamaker-Cleveland, Trice-270-41, and Express for valley land. Acid phosphate at the rate of 200 lbs. per acre and all forms of nitrogen gave paying results.—*H. B. Brown.*

589. AMES, C. T. **Experiments with corn at the Holly Springs Branch Experiment Station.** Mississippi Agric. Exp. Sta. Bull. 189. *8 p.* 1920.—This report gives in brief results from corn variety and fertilizer experiments conducted at the North Mississippi Experiment Station from 1912 to 1920. Corn culture suggestions are also given. Nitrogen fertilizers were the only ones that gave consistently profitable gains.—*H. B. Brown.*

590. AMES, C. T. **Report from Holly Springs Branch Experiment Station for 1915 to 1920 inclusive.** Mississippi Agric. Exp. Sta. Bull. 193. *22 p., 2 fig.* 1920.—This report gives in brief results from corn and cotton variety tests, cultural and fertilizer experiments, and results from experiments with sweet potatoes, Bermuda grass, bur clover, crimson clover, velvet beans, cowpeas, alfalfa, and dairying.—*H. B. Brown.*

591. AYRES, W. E. **Corn variety tests 1913 to 1920 at the Delta Branch Station.** Mississippi Agric. Exp. Sta. Bull. 198. *7p.* 1921.—In the corn variety tests Cocke's Prolific, Ewing's Mosby, Hasting's Prolific, Woodruff's Mosby, and Vardaman were the highest yielding varieties.—*H. B. Brown.*

592. AYRES, W. E. **Cultural experiments with cotton at the Delta Branch Station.** Mississippi Agric. Exp. Sta. Circ. 35. *4 p.* 1921.—Unthinned rows yielded most, but the use of this form of culture is not practicable on account of the difficulty of keeping down weeds. Rows 4 feet apart are considered best with plants 8 inches apart in the row. Factors are given for determining yields when the number of bolls on a 30-foot row is known.—*H. B. Brown.*

593. AYRES, W. E. **Varieties of cotton 1919 and 1920 and summary of ten years' results, 1911-1920, at the Delta Branch Station.** Mississippi Agric. Exp. Sta. Circ. 36. *4 p., 1 fig.* 1921.—In the experiments with cotton Express, Foster, Wannamaker-Cleveland, Lone Star, Webber-49, Trice, Sunflower, Columbia, Triumph, and Miller varieties led in money value per acre in the order given.—*H. B. Brown.*

594. BREAKWELL, E. **The production of better seed in other countries.** Agric. Gaz. New South Wales 32: 245-248. 1921.—Methods of crop improvement in Sweden and methods of improved seed increase and dissemination in Sweden and Canada are briefly described.—*L. R. Waldron.*

595. BRENCHLEY, W. E. **Indian agriculture.** Nature 107: 58-59. 1921.—A brief review of several papers is presented. India is a land of small cultivators who are intensely conservative, usually poor, and unable to take risks in the adoption of new methods. Fertilizers and control of crop pests are especially needed.—*O. A. Stevens.*

596. BROWN, H. B. **Corn experiments.** Mississippi Agric. Exp. Sta. Bull. 197. *20 p., 2 fig.* 1921.—A brief report is presented of certain corn experiments conducted in east-central Mississippi from 1911 to 1920. Cocke's Prolific, Tennessee Red Cob, Vardaman, and Paymaster were the best yielding varieties for early planting, and Laguna, Mexican June, and Goliad for late planting. Inbreeding gave poor-yielding strains; F_1 hybrids of commercial varieties gave but slight gains over their parents. No commercial fertilizers except those containing nitrogen were profitable.—*H. B. Brown.*

597. BROWN, H. B. **Why not plant home grown cotton seed?** Mississippi Agric. Exp. Sta. Circ. 37. *4 p.* 1921.—Tests show that seed from varieties grown within the State produce better-yielding progenies than seed grown in other states.—*H. B. Brown.*

598. Brown, H. B., and C. B. Anders. **Cotton experiments 1919 and 1920.** Mississippi Agric. Exp. Sta. Bull. 187. *32 p., 4 fig.* 1920.—A review is presented of results from a study of leading upland varieties of cotton during 1919 and 1920, with an outline of the environmental conditions under which the tests were made; also of certain fruiting studies, boll weevil control experiments, cotton culture suggestions, and of the relation of oil content of cotton seed to length of lint, size of seed, lint percentage, and nitrogen content of seed. Long staple varieties led in money value, with Foster-120-631 heading the list. A positive correlation was found between oil content of seed and length of lint, and a negative correlation between oil content and size of seed, lint percentage and nitrogen content.—*H. B. Brown.*

599. Brown, W. Robertson, W. H. Harrison, and P. B. Sanyal. **Windrowing sugarcane in the Northwest Frontier Province. Part I. The effect on the economical and agricultural situation. Part II. The effect on the composition of sugarcane.** Mem. Dept. Agric. India Chem. Ser. 5: 237-246. 1920.—Storage of sugarcane by windrowing, a farm operation practiced to prevent freezing of stalks, can be successfully carried out in the Peshawar Valley. Windrowing tends to bring about a deterioration of the juice, but at the same time causes a concentration of the juice so that the amount of crystallizable sugar per unit of juice remains approximately constant. The weight of sucrose and crystallizable sugar in windrowed cane increases rapidly at first, followed by a period when the values remain constant, after which deterioration sets in. The length of the period during which cane can be stored varies with the season.—*J. J. Skinner.*

600. Burtt-Davy, Joseph. **Utilizing prickly pear and spineless cactus. Their value as fodder for live stock.** South African Jour. Indust. 3: 1000-1011. 1920.—The author discusses the utilization of prickly pear and spineless cactus under South African conditions, and brings out the fact that, because of its high water content, it is of especial value in time of drought. As a roughage with more concentrated feed for feeding cattle and as an accessory to the dairy rations when fed with more concentrated foods and some hay or pasture, prickly pear supplies succulence difficult to secure in semi-arid regions during a large period of the year. Working oxen can be maintained for an indefinite period on a ration consisting very largely of prickly pear. Methods of removing the spines, preparation of the cactus as a feed, and chemical analyses are given. The danger of prickly pear becoming a serious pest is pointed out.—*Mary R. Burr.*

601. Correia Afonso, Pedro. **A adubação dos arrozais em teoria na pratica. [Theory and practice of rice fertilization.]** Bol. Agric. [Nova Goa, Portuguese East India] 1: 229-243. 1919.—A very general discussion is presented of rice fertilization both with chemical fertilizers, such as phosphates, and green manure crops. *Crotalaria, Dolichos, Phaseolus* spp., and *Sesbania* are mentioned in particular in the latter connection. Tables giving the chemical composition of the various fertilizers discussed are given.—*John A. Stevenson.*

602. Correia Mendes, F. C. **Relatorio de algums serviços mais importantes a cargo da direcçao dos serviços agricolas e florestais. [Report of the more important projects of the agriculture and forestry service.]** Bol. Agric. [Nova Goa, Portuguese East India] 1: 215-229. 1919.—An account is given of the introduction of seed rice of improved varieties from British India for the purpose of improving rice culture in Portuguese India.—*John A. Stevenson.*

603. Elorduy, Samuel T. **Algunas indicaciones a los cultivadores de maiz. [Hints to corn cultivators.]** Rev. Agric. [Mexico] 5: 344-349. *10 fig.* 1920.—A popular account is given of seed selection as a means of improving the corn crop of Mexico.—*John A. Stevenson.*

604. Ferris, E. B. **A report of work at McNeill Branch Experiment Station from 1912 to 1917 inclusive.** Mississippi Agric. Exp. Sta. Bull. 188. *23 p.* 1920.—A brief report is presented of experiments with fruits, vegetables, cotton, corn, sorghum, cowpeas, soybeans, velvet beans, oats, wheat, sweet potatoes, and fertilizers at McNeill, in south Mississippi.—*H. B. Brown.*

605. Ferris, E. B. **Cotton growing in south Mississippi.** Mississippi Agric. Exp. Sta. Bull. 196. *8 p.* 1920.—Cotton yields in south Mississippi are very uncertain on account of heavy boll weevil damage. Trice is the best variety, and Cleveland probably next. 300 lbs. acid phosphate per acre and some nitrogen carrier are recommended as fertilizers.—*H. B. Brown.*

606. Ferris, E. B. **Report from south Mississippi Branch Experiment Station for 1918 to 1920 inclusive.** Mississippi Agric. Exp. Sta. Bull. 194. *23p.* 1920.—This report gives a history of the South Mississippi Station and results from experiments conducted in 1919 and 1920.—*H. B. Brown.*

607. Fortun, Gonzalo M. **Cultivo de la caña de azucar en Cuba.** [Sugarcane cultivation in Cuba.] Rev. Agric. [Mexico] 4: 421–426. 1919.—Popular.—*John A. Stevenson.*

608. Girola, Carlos D. **Algo sobre cuestiones forrajeras.** [Forage crop problems.] Publ. Mus. Agric. Republica Argentina 22: 1–7. 1920.—Careful consideration should be given to the problem of providing pasturage to maintain and increase the live stock industry of Argentina, which in 1918 had a total export value of 500,000,000 pesos gold. Various plants, among them *Atriplex semibaccata, Polygonum sachalinense, Symphytum asperrimum,* and various of the sorghums have been exploited but are unsatisfactory except under especial limited conditions. Alfalfa will take first rank among the forage crops of the country with a planted area of 10,000,000 hectares. Rye grass, brome grass, the Paspalums and other grasses have proven satisfactory when properly cultivated.—*John A. Stevenson.*

609. Guthrie, F. B. **Analyses of lucerne and tree-lucerne.** Agric. Gaz. New South Wales 32: 238. 1921.—Analyses showed that the 2 plants are similar in composition.—*L. R. Waldron.*

610. Harlan, Harry V., and Stephen Anthony. **Effect of time of irrigation on kernel development of barley.** Jour. Agric. Res. 21: 29–45. *20 fig.* 1921.—"At Aberdeen, Idaho, deposit of dry matter in the barley (*Hordeum*) kernel continues until very near the point of absolute ripeness. The plants are able to utilize water up to the date of full maturity." Late irrigation results in a later maturity. Shortage of water even when the spikes are turning yellow stops the depositing of dry matter. Shortage of water during the early development of the kernel probably determines the size of the kernel, even before the rate of depositing of dry matter is checked.—*D. Reddick.*

611. Harth, E. **Zwiebelanbauversuche im Jahre 1920.** [Onion culture investigations in 1920.] Mitteil. Deutsch. Landw. Ges. 36: 254–257. 1921.—Four varieties of onions were tested in 7 sections. Much of the information is given in tabular form and covers shape, size, and color of bulb, and yields of marketable and unmarketable bulbs.—*A. J. Pieters.*

612. Haywood, A. H. **The culture of sugar cane in New South Wales.** Agric. Gaz. New South Wales 31: 773–780, 853–859. 1920; 32: 28–32, 181–184, 257–260. *13 fig.* 1921.—The area devoted to sugarcane is along rivers on the north coast of New South Wales. The acreage in 1895 was 33,000, which was gradually reduced to 11,000 by 1917; yield of sugar per acre has increased. The author discusses various phases of sugar cane culture in common practice from the preparation of the land to the harvesting of the crop. Important varieties are described, and some of these are figured. Four diseases,—gumming, leaf-scald, Fiji disease, and yellow stripe,—are described and discussed as to prevention and control.—*L. R. Waldron.*

613. Jones, D. F. **Connecticut round tip tobacco. A new type of wrapper leaf.** Connecticut [New Haven] Agric. Exp. Sta. Bull. 228. *287–292, pl. 16–17, fig. 1–4.* 1921.—A description of a new variety of tobacco developed by hybridization and selection is given. The tip of the leaf is round permitting the cutting of a larger number of wrappers than can be had from the leaf of the varieties usually grown in the state. Field tests on farms for 4 years indicate that the variety is productive and has merit as a wrapper leaf.—*Henry Dorsey.*

614. Juritz, Chas. F. **Prickly pear as a stock food.** Jour. Dept. Agric. Union of South Africa 1: 848–851. 1920.—The author states that prickly pear has been of service in South Africa for ostriches, oxen, and pigs. During drought, prickly pear forms a valuable emergency ration but cannot be advantageously fed to stock unless mixed with more concentrated food; to the latter it is a valuable accessory.—*Mary R. Burr.*

615. Kennedy, E. W. **Wheat varieties under trial.** Agric. Gaz. New South Wales 32: 241. 1921.—Yields are given of 4 wheat varieties at Condobolin Experiment Farm.—*L. R. Waldron.*

616. Khols, G. **Steigerung der Ernteerträge durch vervollkommnete Bodenbearbeitung und Saatenpflege.** [Increased yields by perfect soil preparation and care of seed.] Mitteil. Deutsch. Landw. Ges. 36: 225–235. 1921.—A review is presented of work done in 1911–1914, in the cultivation of grain. The author shows that the use of a press drill and of a special cultivator (Hack maschine) was advantageous, especially for wheat. Although the weed problem is not discussed the author quotes with approval a statement of Rümker: "He who cultivates, to destroy weeds, generally cultivates too late to derive the full profit from his labor."—*A. J. Pieters.*

617. Koch, Pieter. **Seed selection of tobacco.** Sun and Agric. Jour. South Africa 11: 44–47. 1920.—The author discusses the characters to be kept in mind when selecting different types of tobacco, and gives notes with illustrations on the technique of bagging and grading.—*A. J. Pieters.*

618. McCauley, C. **Field experiments with fodders. Cowra experiment farm.** Agric. Gaz. New South Wales 32: 237–238. 1921.—Cereals for hay yielded from 6 to nearly 9 tons of green fodder per acre. Rape yielded nearly 6 tons and swede turnips 2.5 tons per acre.—*L. R. Waldron.*

619. Mach, F., P. Lederle, u. s. w. **Prüfung verschiedener Verfahren zum Rauchbarmachen kleiner Tabakmengen.** [Tests of various methods for curing and preparing small quantities of tobacco.] Mitteil. Deutsch. Landw. Ges. 36: 215–217. 1921.—The author describes 3 methods for the home curing of small quantities of tobacco. Tables are given showing the percentages of various substances in the tobaccos cured by each method.—*A. J. Pieters.*

620. McKerral, A. **Report of the Hmawbi Agricultural Station; Report on the Tatkôn Agricultural Station.** Ann. Rept. Agric. Sta., Agric. Chem., Agric. Eng., Asst. Bot. Northern Circle, and Asst. Entomol. Burma 1918–1919: 69–89. 1920.—The report records progress in experiments with fertilizers; methods of cultivation; and selection, trial, and distribution of seeds of crop plants.—*Winfield Dudgeon.*

621. Matenaers, F. F. **Die Silage aus dem Gemenge von Hafer, Erbsen und Wicken.** [Silage out of a mixture of oats, peas, and vetch.] Mitteil. Deutsch. Landw. Ges. 36: 249. 1921.—Much of the paper is a plea for the greater use of the silo in Germany. A brief account of the successful use of a mixture of oats, pea, and vetch silage in Iosco County, Michigan, is presented.—*A. J. Pieters.*

622. Mundy, H. G., J. A. T. Walters, and G. Mainwaring. **Annual report of experiments, Experiment Station, Salisbury, 1919-20.** Rhodesia Agric. Jour. 18: 33–42. *Fig. 1–3.* 1921.—The authors report results of rotation experiments with maize, giving general cultural practices and systems of fertilizing, arriving at the following conclusions: (1) The marked advantage of a change of crop; (2) the increased yield after a straw crop, the stubble of which is ploughed under thereby supplying organic matter to the soil; (3) the still greater yield when the previous crop has been a legume; (4) the outstanding merit of velvet beans as a previous crop; (5) the advantage of early planting in a normal season on the high veld.—Liming trials on ground nuts, maize, beans, summer wheat, and boer manna are reported. No marked

general increase in yield of grain or hay can be attributed to the use of lime in the case of any of these crops.—Variety tests for ground nuts are reported as well as experiments with 19 varieties of dwarf beans and 20 of runner beans. Seed yields of important legumes such as velvet beans, Canadian beans, tepary beans, soybeans, field pea, and chick pea are given. Flax grown for fiber and for seed is discussed. Results with root crops are presented.—*Mary R. Burr.*

623. OLIVARES, DANIEL. **El cultivo de la alfalfa y su henificación. [Alfalfa cultivation and the making of hay.]** Rev. Agric. [Mexico] 5: 427–430. *6 fig.* 1920.—Popular.—*John A. Stevenson.*

624. OLSEN, EDGAR I. **Fifteenth annual report of the state demonstration farms, 1920.** North Dakota Agric. Exp. Sta. Bull. 148. *38 p., 8 fig.* 1921.—Detailed yields are given and methods of operation for the 19 demonstration farms operating in North Dakota. Figures are given for cost of production and also milling and baking data for 29 samples of wheat, grown on the different farms. The report deals with the following crops: Wheat (common and durum), oats, barley, flax, corn, potatoes, alfalfa for hay and seed, timothy, and sweet clover. For 1920 the demonstration farms showed a net profit of $3.13 per acre.—*L. R. Waldron.*

625. OPAZO, ROBERTO. **Cultivo de plantas oleaginosas. [Cultivation of oil plants.]** El Agricultor [Chile] 5: 195–198. *5 fig.* 1920.—Brief cultural directions are given for the peanut, sunflower, poppy, sesamum, and soybean. The olive is not recommended because of its slow growth.—*John A. Stevenson.*

626. OVERGAARD, J. C. **Undersogelser over Landbrugets Driftsforhold. [Survey of the business of agriculture.]** Tidsskr. Landokonomi 1921: 78–87. 1921.—A description is given of economic conditions in Danish agriculture during 1918–19. Tables are included showing the number and size of farms under cultivation, and presenting statistics for livestock on farms, butter production, etc.—*Albert A. Hansen.*

627. PRIDHAM, J. T. **The elimination of the unfit.** Agric. Gaz. New South Wales 32: 235–236. 1921.—The article advocates for use varieties improved by pure line breeding.—*L. R. Waldron.*

628. PRIDHAM, J. T. **Varieties of oats tested in New South Wales.** Agric. Gaz. New South Wales 32: 249–252. 1921.—Notes are given on 72 varieties, including synonyms, in regard to season, character of leaves and straw, appearance of grain, breeding or origin, defects, good points, and districts to which they are suited.—*L. R. Waldron.*

629. RAMÍREZ, ROMÁN. **Anonacea textil. [An anonaceous textile plant.]** Rev. Agric. [Mexico] 4: 505. *1 fig.* 1919.—A brief description is given of *Rollinia* sp. and the fiber obtained from it.—*John A. Stevenson.*

630. ROOT, A. I. **The new sweet clover, grown by the acre.** Gleanings in Bee Culture 49: 46–47. *Fig. 1–2.* 1921.—The new annual sweet clover is a mutant of white sweet clover (*Melilotus alba*). Brief reports are given on the cultivation of annual sweet clover in Ohio, Vermont, Illinois, and Iowa.—*J. H. Lovell.*

631. SAEZ, DANIEL. **El cultivo del algodon en Artigas. [Cotton cultivation in Artigas.]** Defensa Agric. [Uruguay] 1: 281–283. 1920; 2: 24–25. 1921.—A popular account of cotton cultivation is presented.—*John A. Stevenson.*

632. SAILLARD, ÉMILE. **Ensayos culturales sobre diversas variedades de remolacha azucarera durante el año 1920. [Cultural experiments with sugar beet varieties in 1920.]** Informacion Agric. [Madrid] 11: 132–135. 1921.—Experiments were undertaken in 1920 by the syndicate of sugar manufacturers of France with sugar beet varieties. Five foreign and 5

native varieties were tested in 7 localities; the native varieties proved slightly superior. A brief account is given of trials made in England with some of the same varieties. The results of the analyses of 3088 sugar beet roots of the variety Vilmorin B are given. Those containing 19.5 to 20.5 per cent of sugar represented 65 per cent of the total number. In weight, 77 per cent contained between 600 and 1000 gm. of sugar, and included most of the roots with a sugar content of over 20.5 per cent.—*John A. Stevenson.*

633. Sarrasín, J. Maimó. **Una planta dañina. La Melica macra o pasto serrucho. [A noxious weed. Melica macra or saw grass.]** Defensa Agric. [Uruguay] 2: 5–9. 4 *fig.* 1921.—This grass has become a bad weed in the uplands of Uruguay where it is spreading rapidly. It is not eaten by stock nor injured by fire. The spines are injurious to sheep.—*John A. Stevenson.*

634. Scherffius, W. H. **Factors that affect the growth, reproduction, and maturity of tobacco.** Jour. Dept. Agric. Union of South Africa 1: 728–731. 1920.—The author briefly discusses the factors light, including intensity, quality and duration; temperature and moisture; chemical changes; fertility of soil; and their effects on growing tobacco plants.—*Lyman Carrier.*

635. Sears, R. N. **A new clover.** Amer. Bee Jour. 61: 141. 1921.—At Alturas, Modoc County, in the northern part of California, cow clover (*Trifolium involucratum*) is common in the meadows and along streams. According to F. C. Pellett, cow clover resembles alsike clover and has every characteristic of a valuable forage plant. The honey from this new clover is paler than that from alfalfa.—*J. H. Lovell.*

636. Shepherd, A. N. **Farmers' experiment plots. Hay trials, 1920. Murrumbidgee irrigation areas.** Agric. Gaz. New South Wales 32: 239–241. 1921.—Trials were conducted on 4 farms. The results from wheats and oats were nearly the same. Zealand wheat was excellent for hay production under irrigation and Yandilla King gave good returns.—*L. R. Waldron.*

637. Sparks, G. C. **Farmers' experiment plots. Wheat, oat and barley experiments, 1920. Southern district.** Agric. Gaz. New South Wales 32: 229–234. 1921.—These experiments were conducted upon 12 farms; seasonal and soil notes are given. Canberra, Federation, and Yandilla King yielded best. The new variety, Gresley 83, did well at the 1 place where tried. Standard manuring with 56 lbs. of superphosphate per acre gave best results. Early seeding gave best results at 1 farm. Graded seed gave the best average results. Heavy seeding gave the best results generally. One trial showed better yield for unacclimatised seed. Oat and barley trials showed no positive results.—*L. R. Waldron.*

638. Thompstone, E. **Report of the Mandalay Agricultural Station; Report on the Botanical Area, Mandalay; Report on the Bugyi and Nagu Plots; Report of the Padu Agricultural Station; Report of the Hopin Agricultural Station; Report of the Yawnghwe Agricultural Station; Report of the Hsumhsai Experimental Station.** Ann. Rept. Agric. Sta., Agric. Chem., Agric. Eng., Asst. Bot., Northern Circle, and Asst. Entomol., Burma 1918–1919: 1–68. 1920.—At the various stations and plots, work is carried on in investigation of fertilizers and fertilizer methods; methods of cultivation; selection, trial, and distribution to cultivators of promising varieties of field crops. Attention has been given to 2 special problems: The parasitism, and methods of eradication, of *Striga lutea*; and the value and methods of utilization of *Eichornia crassipes* as fertilizer material.—*Winfield Dudgeon.*

639. Trowbridge, P. F. **Report of the director, North Dakota Agricultural College Experiment Station, for the fiscal year ending June 30, 1920.** North Dakota Agric. Exp. Sta. Bull. 146. *48 p., 6 fig.* 1921.—The work reported upon includes comparative yield tests with wheat in a rotation series. Rotation plots in 1919, when rust was exceedingly prevalent, gave better yields than the plots continuously cropped. Baking and milling tests of varieties of wheat

are discussed, likewise forage-crop investigations, including nurse crop experiments with sweet clover, and a botanical study of the vegetative habits of *Bromus inermis*. Notes are given on diseases of wheat and potatoes, disease control, barberry eradication, and resistant strains of flax.—*L. R. Waldron.*

640. Vargas, Leandro M. **Cultivo del ramie.** [Cultivation of ramie.] Rev. Agric. [Mexico] 5: 507–518. *8 fig.* 1920.—A general account is given of the culture of ramie (*Boehmeria nivea* and related species), including geographical distribution, climatic and soil requirements, and botanical description. The method of preparing the fiber is described.—*John A. Stevenson.*

641. Vargas, Leandro M. **Cultivo de la Sansevieria.** [Sansevieria cultivation.] Rev. Agric. [Mexico] 5: 583–585. *2 fig.* 1920.—The growing of sansevieria (*Sansevieria* spp.) is recommended for Mexico. A popular account of the plant and approved methods of cultivation are given.—*John A. Stevenson.*

642. Walters, J. A. T. **New crops for Rhodesia. Report on some of the experiments conducted at the Agricultural Experiment Station, Salisbury, and the Gwebi Farm, 1919-1920.** Rhodesia Agric. Jour. 17: 432–435. *Pl. 1–5.* 1920.—Among the hay crops tested on the experiment station at Salisbury and the experiment farm at Gwebi, Teff (*Eragrostis abyssinica*) made the largest yield, 4,441 lbs. per acre. Kudzu, velvet beans, Boer manna (*Setaria italica*), summer oats, and Sudan grass yielded in the order named. Mixtures of 2 or 3 crops made higher yields than any of the crops alone. The Niger oil plant (*Guizotia oleifera*), Sunn hemp (*Crotalaria juncea*), Gotani bean (*Canavalia gladiata*) [error, = *C. ensiformis*], Kafir beans (*Vigna sinensis*), black velvet beans (*Stizolobium utile*) [error, = *S. aterrimum*], Florida velvet bean (*Stizolobium deeringianum*), and ground nuts (*Arachis hypogaea*) were tested as green manures and yielded in the order named from 29,040 to 7,920 lbs. per acre. Among the cereals, Kherson oats and buckwheat were promising, the latter principally on account of its freedom from disease. Eighteen varieties of Kafir corn, 34 of Dhal (*Cajanus indicus*), and several of field peas were also tested.—*H. N. Vinall.*

643. Warth, F. J. **Annual Report of the Agricultural Chemist to Government, Burma.** Ann. Rept. Agric. Sta., Agric. Chem., Agric. Eng., Asst. Bot. Northern Circle, and Asst. Entomol. Burma 1918-1919: 90. 1920.—Progress is recorded in investigations on rice soils; and on Burma beans (*Phaseolus lunatus* L.).—*Winfield Dudgeon.*

644. Werth, E. **Übersicht über die Kartoffelsorten, die sich bei den bisher in Deutschland angestellten Versuchen zur Prüfung der Widerstandsfähigkeit gegen Kartoffelkrebs bewährt haben.** [Review of the potato varieties which have, in the experiments so far carried on in Germany, retained their immunity to potato wart.] Mitteil. Deutsch. Landw. Ges. 36: 62. 1921.—The author lists a total of 52 varieties of potatoes and gives in tabular form information as to skin, flesh, form, total number of experiments, and degree of infection.—*A. J. Pieters.*

645. Wiebup. **Anbauversuche mit Bohnen.** [Culture experiments with beans.] Mitteil. Deutsch. Landw. Ges. 36: 245–249. 1921.—Reports are given from 6 different stations on tests of a number of varieties of field beans.—*A. J. Pieters.*

646. Young, Thomas. **Flax growing in Scotland.** Trans. Highland and Agric. Soc. Scotland 22: 79–100. 1920.—The history of flax growing in Scotland and its reestablishment during the war are discussed.—*H. V. Harlan.*

647. Zurcher, F. A. **Non-setting of Uba seed.** South African Sugar Jour. 5: 245. 1921.—The Uba sugar-cane arrows freely in Portuguese East Africa (the Zambesia and Quilimane districts) but the flowers are sterile. For 4 years experiments have been made in which every means and care were taken to obtain fertilization, but no seed has set.—*C. Rumbold.*

BIBLIOGRAPHY, BIOGRAPHY AND HISTORY

Neil E. Stevens, *Editor*

(See also in this issue Entries 606, 646, 680, 703, 799, 1073, 1076, 1078, 1080)

648. Anonymous. **Augustin de Candolle.** Roy. Bot. Gard. Kew. Bull. Misc. Inform. 1920: 219–220. 1920.—Richard Emile Augustin de Candolle (1868–1920), younger son of Casimir de Candolle, was born and received part of his education in England. Though trained for the law, he devoted himself largely to scientific pursuits and had a wide range of scientific interests. For the period 1912–1918, he served as British consul for the Canton of Geneva, relinquishing this post on the death of his father, to take up the custodianship of the famous Candollean library and herbarium and to resume his interrupted scientific occupations.—*M. F. Warner.*

649. Anonymous. **Biography and portrait of Dr. F. Kolpin Ravn made available.** Phytopathology 11: 101–102. 1921.

650. Baccarini, Pasquale. **[Piero Bargagli, 1844–1918.]** Bull. Soc. Bot. Ital. 1918: 68. 1918 [1919].—Bargagli was one of the founders of the Italian Botanical Society and author of a number of botanical papers.—*M. F. Warner.*

651. Britten, James. **London Pride.** Garden 84: 528. 1920.—The author discusses the question whether this name for *Saxifraga umbrosa* is derived from the city, or, as has been asserted, from George London (died 1713), who founded the Brompton Park Nursery in 1681, and was gardener to Henry Compton, Bishop of London, to William and Mary, and to Queen Anne. The name "London Pride" was given to Sweet William as far back as 1633, being found in Johnson's edition of Gerard, and while it was applied to *Saxifraga umbrosa* by Molyneux (Phil. Trans. 19: 570) in 1697, it seems unlikely that it originated with George London, as it had so long been used for another familiar plant. Other plants to which the name has been applied are mentioned, as well as other names referring to the same plant.—*M. F. Warner.*

652. Bunyard, E. A. **John Tradescant, senior.** Jour. Pomol. 1: 188–196. *1 fig (portrait).* 1920.—Tradescant has been identified by Dr. J. Hamel as author of the MS. in the Record Office, entitled "A Voiag of Ambussad undertaken by the Right Honourable Sir Dudlie Diggs in the year 1618," which took him to Archangel. In 1611 he visited the Low Countries in search of new plants and fruits for Lord Salisbury's gardens at Hatfield; in 1620–21 he joined Mansell's expedition against the Algerian pirates, and succeeded in bringing home plants and flowers; and in 1627 he accompanied the Duke of Buckingham on his ill-fated expedition to La Rochelle. The rare Musaeum Tradescantianum is the list of curiosities in "Tradescant's Ark" at Lambeth, published by the younger John Tradescant in 1656.—*M. F. Warner.*

653. Butler, E. J. **The imperial (British) Bureau of Mycology.** Phytopathology 11: 100. 1921.—The purpose of the Bureau, now established at Kew, and the scope of the work to be carried on are given.—*B. B. Higgins.*

654. C., H. **Ancient mulberry trees and their history.** Country Life [London] 43: 145. *Illus.* 1918.—Many specimens have been planted by famous personages. One still standing and bearing excellent fruit at Christ Church College, Cambridge, is reputed to have been planted by Milton, but is probably the last of 300 trees set out in 1608–09, the year of his birth. Those at Syon House are of especial interest, including one said to be the oldest in England, introduced from Persia in 1548. Another, planted at Buckingham Palace at the time of the edict of James I for the introduction of silk culture into England, is still bearing fruit. Although the mulberry was made fashionable by this edict about 1605, it is an interesting fact that the trees then planted were mostly of the black sort, the leaves of which are not valuable for silkworms.—*M. F. Warner.*

655. DANGEARD, P. A., H. LECOMTE, ET E. PERRIER. **Discours prononcés aux obsèques de M. Éd. Bureau, professeur honoraire du Muséum. (18 decémbre 1918.) [Funeral addresses for Édouard Bureau.]** Bull. Mus. Hist. Nat. Paris 25: 2–11. 1919.—Three addresses on the life and career of Louis Édouard Bureau (1830–1918) are given. Dangeard, president of the Botanical Society of France, refers to him especially as one of the founders of the society; his work as a botanist, and particularly in the field of paleobotany, with his long active scientific service (1872–1906) at the Paris Museum of Natural History, are discussed by Lecomte of the Museum; while Perrier, as its director, speaks more particularly of Bureau's official connection with that institution.—*M. F. Warner.*

656. FAIRCHILD, DAVID. **An agricultural explorer in China.** Asia 21: 7–13. *Illus.* 1920 [1921].—A popular sketch of the unusual personality, romantic and dangerous experiences, and practical achievements of FRANK N. MEYER, who disappeared from a steamer on the Yangtze River, June 2, 1918. Some of his important introductions are briefly discussed: Fruits, ornamentals, a wild chestnut with strong resistance to the bark disease, and many others. His peculiar qualifications for, and devotion to, his work are emphasized. "His life was always that of a plantsman"—"extremely sensitive to the world around." His associates in the Office of Foreign Seed and Plant Introduction have established in his honor a medal to be awarded yearly for valuable work in plant introduction, the first recipient of which was Mr. Barbour Lathrop of San Francisco, the second Dr. L. Trabut, of Algiers.—*M. F. Warner.*

657. FAURÉ-FREMIET, E. **Le mouvement actuel pour la réorganisation des recherches scientifiques en France. [The present movement for reorganization of scientific research in France.]** Bull. Soc. Philomathique Paris X, 11: 1–79. 1920.—The author presents a history of the organization and activities of various French and inter-allied scientific conferences and federations during 1919 and 1920. The results obtained are summarized under the headings: Fauna of France; analytic bibliography; scientific publications; material aid to societies.—*C. E. Allen.*

658. GUYER, R. G. **Cultivation of medicinal plants in Scotland—past and present.** Pharm. Jour. 106: 146–149, 168–171, 190–192. *Fig. 1–6.* 1921.—As early as 1661 the gardener of George Heriot's Hospital in Edinburgh had been directed to plant all kinds of "phisical, medicinal, and other herbs," but in 1670 Sir Robert Sibbald (born 1641), who was afterwards first professor of Medicine at the University of Edinburgh and first president of the Royal College of Physicians, together with his friend Dr. Andrew Balfour, developed (1) a small "Medicine Garden" in the Abbey gardens, and in 1677 they founded (2) the Town Garden at Trinity Hospital, both of which were placed in charge of James Sutherland, who in 1683 published Hortus Medicus Edinburgensis; or a Catalogue of the Plants in the Physical Gardens at Edinburgh. In 1702 (3) the University Garden was established at "Kirk o'Fields," and all 3 gardens, though independent, were in control of Sutherland, who was also professor of Botany in the Town College. In recent years Thomas Fairgrieve (1819–1893) had a drug-plant garden at Ormiston, and John Duncan a large collection of medicinal plants under cultivation where St. Peter's Church now stands. The most modern drug-plant garden in Edinburgh is that of Duncan, Flockhart & Co. (1915), just across the way from the Royal Botanic Gardens. They are growing commercially aconite, belladonna, colchicum, foxglove, henbane, poppies, roses, stramonium, and valerian. Among the experimental crops are broom, calendula, conium, chamomile, dandelion, elder, fennel, juniper, licorice, timothy grass, veratrum, and male fern. The author gives many details in regard to Sibbald and Sutherland, and much attention to the modern methods of cultivation, soil and manurial requirements, manner of collection, drying and preservation, and commercial success of the various drug crops.—*E. N. Gathercoal.*

659. HERRINGTON, ARTHUR, AND J. W. ELLIOTT. **William Robinson, the man and his work.** Garden Mag. 31: 253–257. *Illus., including portrait.* 1920.—"The work that he has done," is by Herrington; and "His gardens at Gravetye Manor," by Elliott.—*M. F. Warner.*

660. Huffel, Gustave. **Dénominations anciennes de nos forêts.** [Former terminology of our forests.] Bull. Trimest. Soc. Forest. Franche-Comté et Belfort 13: 267–273. 1920.—A list of terms applied to forests by the French in the feudal period is given with brief descriptions of their origin and use.—*S. T. Dana.*

661. Jermstad, A. **Ueber Carl von Linnés Beziehungen zur Pharmazie und zu den Apothekern.** [On Carl von Linne's connection with pharmacy and apothecaries.] Schweiz. Apoth. Zeitg. 58: 533–536. 1920.—The work of Linnaeus as inspector of pharmacies, and his continued interest in the advancement of the profession are discussed. In 1741 he published a list of the native medicinal plants of Sweden which ought to be familiar to the pharmacist, and the Pharmacopoea svecica I (1775) was largely due to his instigation. He recommended the cultivation in Sweden of foreign medicinal plants, not in the botanical gardens, but on a large scale in physic gardens. Ferber, a pharmacist of Karlskrona, had such a garden at Agerum, and published an index of about 400 plants grown there under the title: Hortus Agerumensis (1739), said to be the first work printed in Sweden in which the Linnaean sexual system was employed.—*M. F. Warner.*

662. Le Lectier. **Catalogue des arbres cultivez dans la verger et plan du Sieur Le Lectier procureur du roy à Orléans. M.DC. XXVIII.** [The catalogue of fruit trees of Le Lectier.] *15 × 12 cm., 35 + 1 p.* Privately printed [for E. A. Bunyard: Maidstone, England, 1920.]—The catalogue is printed from a transcript made by M. Gibault of the French national horticultural society, from the original in the Bibliothèque Nationale, Paris, which is supposed to be unique. It also appeared in Jour. Pomology 1: 242–252, 1920, under English title as above. A long list of varieties grown by an amateur in the early 17th century, comprising pears classed according to season, apples, plums, cherries, peaches, figs, and other fruits.—*L. H. MacDaniels.*

663. Lister, Gulielma. **Sir Edward Fry.** Proc. Linn. Soc. London 131: 53–54. 1919.—Eminent as lawyer, judge, and arbitrator, he was strongly interested in botany from his boyhood days, and published British Mosses (1892 and 1908), and with his daughter, Agnes, The Mycetozoa (1899), and The Liverworts (1911). He was born Nov. 4, 1827, and died Oct. 18, 1918.—*M. F. Warner.*

664. Mitchell, Donald. **Note on medicinal plant cultivation at Inverness: an old Highland pharmacist's experiences.** Pharm. Jour. 106: 232–233. 1921.—About the beginning of the 19th century there were at least 3 physic gardens in the immediate vicinity of Inverness. In 1808 peppermint was extensively cultivated. The oil of peppermint was obtained by distillation and sold in the wholesale market. The collection of bearberry leaves (*Arctostaphylos Uva-ursi*) was also a considerable industry near Inverness at this time, and dandelion root was collected and an extract prepared from it.—*E. N. Gathercoal.*

665. Oberly, E. R. **List of literature on phytopathology.** Phytopathology 11: 101. 1921.—In view of the discontinuance of this list, the bi-weekly list of current literature prepared in the Bureau of Plant Industry Library is offered to members of the Phytopathological Society.—*B. B. Higgins.*

666. Payne, C. H. **A strawberry bibliography.** Jour. Pomology 1: 235–242. 1920.—A list is presented of nearly 100 titles, arranged as American, English, French, and German works, exclusive of articles in periodicals.—*L. H. MacDaniels.*

667. Pruessner, A. H. **Date culture in ancient Babylonia.** Amer. Jour. Semitic Lang. and Lit. 36: 213–232. 1920.—The author presents documentary material from the Code of Hammurabi, contract literature, and the Babylonian Talmud, showing requirements imposed upon the tenant or cultivator, data on methods of planting, care of trees, process of pollination, returns from and value of date orchards in the Hammurabi period.—*M. F. Warner.*

668. SEWARD, A. C. **Prof. A. G. Nathorst.** Nature 107: 112–113. 1921.—Alfred Gabriel Nathorst, who died at Stockholm, Jan. 20, 1921, at the age of 70, was director of the Paleobotanical Museum of the Swedish Academy for the greater part of his life. He discovered many new generic types of special interest from the point of view of evolution (*Pseudobornia, Lycostrobus, Cephalotheca, Wielandiella, Cycadocephalus, Camptopteris*); carried out explorations in Spitsbergen and other arctic countries, and published numerous papers on the Rhaetic floras of Scania. "It is to Nathorst more than any other man that we owe our knowledge of Arctic floras extending from the Devonian to the late Tertiary period." A lovable personality and delightful companion.—*O. A. Stevens.*

669. TUCKER, E. M. **Bibliographical notes.** Jour. Arnold Arboretum 2: 181–184. 1921.—The dates of publication of the volumes of Nouveau Duhamel and of the parts of Torrey & Gray, Flora of North America, and other bibliographical notes on these 2 works are given.—*Alfred Rehder.*

670. WHETZEL, H. H. **The Phytopathological Society of France.** Phytopathology 11: 100–101. 1921.

671. WILSON, E. H. **The romance of our trees.** *xvi + 278 p., 45 pl., incl. front.* Doubleday, Page & Co.: Garden City, New York, 1920.—A series of popular essays on interesting trees; their varieties, history, literary and legendary associations; with special chapters on the ginkgo, cedar of Lebanon, yew, horsechestnut, magnolias, beech, nut and fruit trees, Lombardy poplar, and Babylon willow, part of which were also published in the Garden Magazine, 1919–20 [see Bot. Absts. 6, Entries 1471, 1472, 1473, 1876, 1877].—*M. F. Warner.*

BOTANICAL EDUCATION

C. STUART GAGER, *Editor*

ALFRED GUNDERSEN, *Assistant Editor*

(See also in this issue Entries 818, 864, 998)

672. ANONYMOUS. [Rev. of: BEVIS, J. F., and H. J. JEFFREY. **British plants: their biology and ecology.** *2nd ed., xii + 345 p., 115 fig.* Methuen & Co.: London, 1920.] Sci. Prog. [London] 15: 670–671. 1921. [See also Bot. Absts. 9, Entry 676.]

673. ANONYMOUS. [Rev. of: DENSMORE, H. D. **General botany for universities and colleges.** *xii + 459 p., 289 illus.* Ginn & Co.: London and New York, 1920.] Sci. Prog. [London] 15: 668–669. 1921.—"The matter is written in an interesting style . . . the illustrations, too, are good, and the diagrams especially exhibit a quite unusual standard of conception." [See also Bot. Absts. 9, Entry 679.]—*J. L. Weimer.*

674. ANONYMOUS. [Rev. of: FRITCH, F. E., and E. J. SALISBURY. **An introduction to the structure and reproduction of plants.** *viii + 458 p., 230 fig. & illus.* G. Bell & Sons: London, 1920.] Sci. Prog. [London] 15: 671–672. 1921.

675. ANONYMOUS. [Rev. of: JONES, W. N., AND M. C. RAYNER. **A text book of plant biology.** *viii + 262 p., 6 pl., 36 fig.* Methuen & Co.: London, 1920.] Sci. Prog. [London] 15: 672. 1921.

676. B., W. E. [Rev. of: BEVIS, J. F., and H. J. JEFFREY. **British plants: their biology and ecology.** *2nd ed., xii + 346 p., 115 fig.* Methuen and Co.: London, 1920.] Nature 107: 71. 1921. [See also Bot Absts. 9, Entry 672.]

677. BAKER, RICHARD T. **Scientific names for commercial timbers.** Nature 107: 45. 1921.—Instances are cited where the scientific names have been put into general use in Australia.—*O. A. Stevens.*

678. Brunnhofer, A. von. **Verwaltungsrecht und Holzhandel—zwei Vorlesungen die an der Schweizer. Techn. Hochschule gehalten werden sollten. [Administration and timber sales—two subjects that should be taught in the colleges of Switzerland.]** Schweiz. Zeitschr. Forstw. 72: 142–146. 1921.—The timber sale policy should be placed on a uniform basis, especially stumpage prices. At present, each community sells to its own advantage at the expense of the general market. Strong courses in these subjects would create a uniform method and bring about application. Courses should be strengthened in practical road building, special chemistry, soil studies, bacteriology, geology, field excursions, and practical forestry.—*J. V. Hofmann.*

679. D., M. **New American text books of botany.** [Rev. of: Densmore, Hiram D. **General botany for universities and colleges.** *xii + 459 p.*; **Laboratory and field exercises for general botany.** *viii + 199 p.* Ginn and Co.: Boston and London, 1920.] Nature 107: 69–70. 1921.—The reviewer finds the text lacking in continuity and balance. "Figure 146, which purports to be *Amanita muscaria*, is clearly a *Coprinus*." The section on seasonal life of certain common plants is a good feature. [See also Bot. Absts. 9, Entry 673.]—*O. A. Stevens.*

680. Gager, C. Stuart. **Tenth annual report of the Brooklyn Botanic Garden, 1920.** Brooklyn Bot. Gard. Rec. 10: 23–81. 1921.—The report contains a résumé of the 1st decade of the Botanic Garden, as well as data for 1920. Reports of heads of departments, and a financial statement are included; also a bibliography of publications of members of the staff, and, as Appendix 6, the Agreement between the Ecological Society of America and the Brooklyn Botanic Garden concerning the publication of the journal, Ecology.—*C. S. Gager.*

681. K., F. **Plant biology.** [Rev. of: Jones, W. Neilson, and M. C. Rayner. **A text book of plant biology.** *viii + 262 p., 6 pl.* Methuen and Co.: London, 1920.] Nature 107: 37–38. 1921. [See also Bot. Absts. 9, Entry 675.]

682. Newman, L. F., and H. A. D. Neville. **A course of practical chemistry for agricultural students. Vol. I.** *235 p.* University Press: Cambridge, 1920.—Laboratory exercises are given with blank pages for notes interleaved. Vol. I is intended to cover the 1st year's course on the chemistry and physics of the soil; it comprises 43 chapters and an appendix of tables of constants and analyses. Volumes II and III are announced to follow.—*C. S. Gager.*

CYTOLOGY

Gilbert M. Smith, *Editor*
George S. Bryan, *Assistant Editor*

(See also in this issue Entries 731, 1033)

683. Arloing, F., et G. Richard. **Sur la coloration vitale des corpuscules métachromatiques du Bacille diphtérique. [Intravital staining of the metachromatic corpuscles of the Bacillus of diphtheria.]** Compt. Rend. Soc. Biol. Paris 83: 267–269. 1920.—The granules of *Corynebacterium diphtheriae* react as metachromatic bodies when sufficient Nile Blue to give a barely perceptible tint is added to a hanging drop culture. The bodies of the bacterial cell are stained light blue and the granules rose colored or mauve or violet in 5–15 minutes. The bacteria remain alive in this dilute stain for many hours and appear normal.—*E. A. Bessey.*

684. Armand, L. **Les phénomenes nucléaires de la cinèse hétérotypique chez le Lobelia urens et chez quelques Campanulacées. [The nuclear phenomena in the heterotypic mitosis of Lobelia urens and in other Campanulaceae.]** Compt. Rend. Acad. Sci. Paris 172: 762–764. 1921.—A study of the stages in synapsis and the heterotypic division of the nuclei of the Campanulaceae is reported. Parasynapsis is not found to occur. A simple longitudinal spireme

is found which breaks up into n in place of $2n$ number of elements. The 2nd synaptic contraction takes place in the typical fashion.—*C. H. Farr.*

685. CUTLER, D. W. **The cytological problems arising from the study of artificial parthenogenesis.** Sci. Prog. [London] 15: 435–444. 1921.

686. DANGEARD, P. A. **Vacuome, plastidome et sphérome dans l'Asparagus verticillatus. [The vacuomes, plastidomes, and spheromes of Asparagus verticillatus.]** Compt. Rend. Acad. Sci. Paris 171: 69–74. *Fig. 1–16.* 1920.—The vacuome is shown to be a permanent portion of the cell, sometimes appearing as metachromatin and sometimes as vacuoles. Anthocyan is formed in the vacuoles and not in the plastids. Likewise, the plastidome may be in the form either of mitoplasts or plastids. The spherome is composed of microsomes.—*C. H. Farr.*

687. EMBERGER, L. **Étude cytologique des organes sexuels des Fougères. [A cytological study of the sex organs of ferns.]** Compt. Rend. Acad. Sci. Paris 171: 735–737. 1920.—The paper reports on a mitochondrial study of the prothallia of ferns. During the formation of the sperm mother-cells the chloroplasts become transformed into chondrioconts. In the sperm itself the mitochondria are all granular. A similar transformation occurs in the egg. The fertilized egg has the same chondriosomal appearance as the apical cell of the stem.—*C. H. Farr.*

688. GUILLIERMOND, A. **A propos de la constitution morphologique du cytoplasme. [Concerning the morphological constitution of the cytoplasm.]** Compt. Rend. Acad. Sci. Paris 172: 121–124. *Fig. 1–8.* 1921.—A résumé is presented of the study of mitochondria in animals, fungi, and green plants. The author reiterates his former contention that there are 2 kinds of mitochondria in green plants, one of which is concerned with photosynthesis. In addition to these there are in the cytoplasm the fatty granules and the vacuoles.—*C. H. and W. K. Farr.*

689. GUILLIERMOND, A. **Observation vitale des chrondriome des champignons. [Observations of the chondriome in living fungi.]** Compt. Rend. Soc. Biol. Paris 83: 404–408. *Fig. 1–11.* 1920.—In young growing unstained mycelia of *Endomyces Magnusii* careful observation shows nuclei, minute fat drops, vacuoles, and elongated thread-like chondriomes. Staining *intra vitam* with Dahlia Violet in very dilute solution shows that these chondriomes have a granular structure. In the older filaments the small vacuoles enlarge and fuse into larger vacuoles without modification of the chondriomes, which have no connection with them. Fixation with Fleming's solution, with acetic acid omitted, and staining with Fuchsin shows that the chondriomes are unchanged.—*E. A. Bessey.*

690. GUILLIERMOND, A. **Sur la coexistence dans la cellule végétale de deux variétés distinctes de mitochondries. [The existence of two sorts of mitochondria in plant cells.]** Compt. Rend. Soc. Biol. Paris 83: 408–411. *Fig. 1.* 1920.—In the meristem of root tips of peas chondriomes are present as filaments, short rods, or granules, that are all alike in staining and other characters. In the plerome and periblem there are bodies that stain less heavily, and which remain of chondriome nature, and bodies that stain heavily and elaborate starch grains. In the sporangia and other parts of the fern the chloroplasts also are similar to these heavily staining chondriomes and many lose their chlorophyll and become smaller and reduced to typical chondriomes. The author considers that plastids are usually (but not always) enlarged forms of these more heavily staining chondriomes.—*E. A. Bessey.*

691. GUILLIERMOND, A. **Sur la métachromatine des champignons. [The metachromatin of fungi.]** Compt. Rend. Soc. Biol. Paris 83: 259–263. *1 pl.* 1920.—In the vacuoles of various fungi, *intra vitam* staining reveals small granules of metachromatin, which may increase in size under the influence of certain stains (e.g., neutral red). Sometimes these appear without staining as more refringent bodies in the vacuole. Evidently the metachromatin is mostly in solution but is precipitated out by the action of certain stains, changes in acidity, etc.—*E. A. Bessey.*

692. Guilliermond, A. **Sur l'origine des vacuoles dans les cellules de quelques racines. [The origin of the vacuole in the cells of some roots.]** Compt. Rend. Soc. Biol. Paris 83: 411-414. *Fig. 1-10.* 1920.—In living rootlets of barley observed in an isotonic sugar solution the cells near the tip contain very numerous, elongated refractive filaments resembling chondrioconts that can be colored by *intra vitam* staining with Neutral Red or Nile Blue. In older cells they contract and enlarge and eventually anastomose or fuse to become true vacuoles, the staining becoming fainter as if the stainable substance were becoming diluted. Fixation and staining shows the chondriomes in the cells even where the vacuoles are already well developed. In certain plants, such as gourd, root tips fixed and stained by Regaud's method show true chondrioconts and mitochondria in addition to these vacuole-producing bodies. The author doubts whether the latter really ought to be considered as of chondriosomal nature. These, not the true chondriosomes, are the structures Dangeard has studied by *intra-vitam* staining methods.—*E. A. Bessey.*

693. Herrera, A. L. **Artificial cells.** Sci. Amer. Monthly 3: 221-222. *Fig. 1-3.* 1921. [Translated from La Nature (Paris), July 31, 1920.]—An account is given of some experiments seeking to imitate natural cells. Artificial cells thus produced exhibited all the morphological characteristics of cell wall, cytoplasm, nucleus, and even mitotic division.—*Chas. H. Otis.*

694. Janssens, F. A. **Observations sur les mouvements des flagelles de la Polytoma uvella (Ehrenb.). [Observations on the movements of the flagella of Polytoma uvella.]** Compt. Rend. Soc. Biol. Paris 83: 296-299. *Fig. 1-14.* 1920.—The 2 flagella pointing straight forward make a sudden sweep of nearly 180°, making thus a sharp curve at the point of attachment. This curve progresses up the flagellum so that the recurved portion becomes shorter and shorter and the forward pointing portion longer until the original position is reached.—*E. A. Bessey*

695. Kihara, Hitoshi. **Über cytologische Studien bei einige Getreide-Arten, Mitteilung III. Über die Schwankungen der Chromosomenzahl bei den Speciesbastarden Triticum-Arten. [Cytological studies on some wheat species. III. Concerning the fluctuation of the chromosome number in Triticum species hybrids.]** Bot. Mag. Tôkyô 35: 19-44. *Pl. 1.* 1921.—The author described chromosome behavior in F_2, F_3, and F_4 of crosses between *T. polonicum* ($x = 14$) female and *T. spelta* ($x = 21$) male. He assumes that the F_1 hybrid ($2x = 35$), owing to the specificity of individual chromosomes, would form functional gametes only when the gamete contains either a complete set of 21 *spelta* or 14 *polonicum* + *i* (isolated or unpaired) *spelta* chromosomes. Fertilization of 14 + *i* gametes with one another gives *polonicum*-like plants, in whose meioses the *i* (isolated or unpaired) chromosomes tend to lag behind and be left out of the homeotypic nuclei. Succeeding generations tend to return to the *polonicum* type with 28 chromosomes. Gametes with 21 *spelta* chromosomes may fuse with one another or with 14 *polonicum* + *i* *spelta* and give rise to *spelta*-like plants. A thorough study of the descendants of one F_2 hybrid with 38 chromosomes (17 bivalents + 4 isolated) showed plants with 38, 39, 40, and 41 chromosomes only. A plant in another series showed 42. This 38-chromosome plant formed gametes with 17, 18, 19, 20, and 21 chromosomes. As shown above, however, only such combinations were viable as arose when one gamete had a full complement of 21 *spelta* chromosomes. Examination of the meiotic figures of these descendants showed invariably 17 pairs + 4 *i* (38), 18 pairs + 3 *i* (39), 19 pairs + 2 *i* (40), 20 pairs + 1 *i* (41), or 22 pairs. No plants were found with 34, 35, 36, 37 or any chromosome combinations other than those specified above. The paper is accompanied by unusual photomicrographs of meiotic figures and contains a discussion of the probable application of the author's conclusions to the facts uncovered in *Oenothera* by Gates, Stomps, Lutz, Geerts, and others.—*Leonas L. Burlingame.*

696. Kylin, Harald. **Bemerkungen über den Bau der Spermatozoiden der Fucaceen. [Observations concerning the structure of the sperms of Fucaceae.]** Ber. Deutsch. Bot. Ges. 38: 74-78. *Fig. 1-2.* 1920.—Retzius and Meyes' observations on the structure of *Fucus*

sperms are briefly stated. MEYES was not in agreement with the findings of Kylin (1916) on the same subject, a fact which led Kylin to review his work. He investigated the sperms of *Fucus Areschougii* killed with ALTMAN's mixture, stained with rosanilin, and preserved in potassium acetate solution. This revealed a red colored "plastomere" at the rear of the chromatophore; and in front of it a light red-colored granule, the "blepharoplast," from which spring the 2 cilia. Staining with haemalum shows the blue-staining nucleus, lying opposite the "blepharoplast." The author states that the chromatophore first develops as a leucoplast.—*N. L. Gardner.*

697. LITARDIÈRE, R. DE. **Le dimorphisme des éléments chromosomiques chez le Polypodium Schneideri pendant les périodes de télophase et d'interphase. [The dimorphism of the chromosomes of Polypodium Schneideri during the periods of telophase and interkinesis.]** Compt. Rend. Acad. Sci. Paris 172: 607–608. 1921.—*Polypodium Schneideri* is a hybrid between *P. aurea* and *P. vulgare* var. *cornubiense*. Two sets of chromosomes appear in the telophase and persist during interkinesis, but during the prophase the heteromorphic nature of the chromosomes disappears and in the metaphase very little difference can be seen between them.—*C. H. Farr.*

698. MANGENOT, G. **Sur le chondriome et les plastes dans l'anthéridie des Fucacées. [The chondriome and plastids in the antherids of Fucaceae.]** Compt. Rend. Soc. Biol. Paris 83: 275–276. *Fig. 1–5.* 1920.—The plastids in the cells destined to become the antherids divide by simple fission until they are numerous. At the same time the nuclei are dividing. The plastids become paler, more elongated, and finally reach the state of true, almost colorless chondrioconts that later become red-orange in color and fusiform in shape and lie appressed, 1 to each nucleus, forming the red point of the future antherozoid. The granular mitochondria remain unchanged during this plastid change, grouping themselves in groups of 5–8 in the vicinity of each nucleus.—*E. A. Bessey.*

699. MANGENOT, G., ET L. EMBERGER. **Sur les mitochondriès dans les cellules animales et végétales. [Mitochondria in animal and plant cells.]** Compt. Rend. Soc. Biol. Paris 83: 418–420. *Fig. 1–6.* 1920.—The cells of the liver and kidney of the frog and of the root of a fern (*Anthyrium*) fixed and stained by REGAUD's method show similar mitochondria,—rods, filaments, and granules. The authors believe these structures are homologous. They differ from the vacuole-producing bodies of similar appearance in that they do not stain intravitally. The chondriome and vacuome systems are distinct.—*E. A. Bessey.*

700. MÖBIUS, M. **Über die Grösse der Chloroplasten. [On the size of chloroplasts.]** Ber. Deutsch. Bot. Ges. 38: 224–232. 1920.—The author presents in tabular form his measurements of the greatest diameter of the chloroplasts of 215 species, including a number of algae, liverworts, and mosses in addition to 206 vascular plants. Half of the plants in this list have chloroplasts 5 μ in diameter and 75 per cent of them have chloroplasts between 4 and 6 μ in diameter. There is little evidence of any relation between size and systematic position. The range within the Nymphaeaceae (*Victoria regia* 7–10 μ and *Nelumbium speciosum* 4–5 μ) is almost as great as the range (3–10 μ) in all plants examined. No relation exists between the size of cells, size of leaves, texture of leaves, or habitat of the plant and the size of the chloroplasts. Excluding succulent water plants the herbaceous plants generally have larger chloroplasts than woody ones, possibly because of the relatively smaller water content of the leaf cells of woody plants. The relatively constant size of the nucleus throughout the plant kingdom is that which is most favorable for the molecular adsorption force by which, according to WILLSTÄTTER, the chlorophyll pigment is held on the framework of the chlorophyll grain. This constancy of size of the chloroplast he contrasts with the wide range in size of mature parenchyma cells (.01–.09 mm.) and of nuclei (in monocotyledons 2.5–17 μ).—*R. M. Holman.*

701. SEIFRIZ, WILLIAM. **Observations on some physical properties of protoplasm by aid of microdissection.** Ann. Bot. 35: 269–296. *1 fig.* 1921.—A discussion is presented of the

knowledge of cellular organization obtained by direct dissection of living material with Chamber's modification of the Barber apparatus. The material studied included plants from most of the great groups, as well as protozoa and other animals. Plasma membranes differing in physical and probably chemical structure are found on all protoplasmic surfaces and may be removed by direct dissection. The plasma membrane has a thickness of about $\frac{1}{10}\mu$. Vacuolar and nuclear membranes may also be removed in the same manner. These microdissections are possible because of the immiscibility of protoplasm, using the term in its broadest sense, with water—an immiscibility which is due to the colloidal nature of the living substance as contrasted with the miscibility of water with protoplasm when the latter is dead or near death. Since there is this immiscibility with water the absorption of water is considered an imbibition process.—*Gilbert M. Smith.*

FOREST BOTANY AND FORESTRY

Raphael Zon, *Editor*

J. H. Hofmann, *Assistant Editor*

(See also in this issue Entries 660, 671, 677, 678, 878, 955, 969, 983, 1092)

702. Anonymous. **Brändespörgsmaalet og Dansk Skovforenings Stilling dertil. [The fuel situation and the position of the forestry association on this question.]** Dansk Skovforenings Tidsskr. 5: 265–286. 1920.—Reports and recommendations of the Danish Forestry Association relative to utilization, prices, laws and regulations, administration, and standards of measurement are presented.—*J. A. Larsen.*

703. Anonymous. **Die Waldverhältnisse Griechenlands. [The forest conditions of Greece.]** Wiener Allg. Forst- u. Jagd Zeitg. 38: 310–311, 317, 319. 1920.—In ancient Greece the forests covered a large area; at present only about $\frac{1}{10}$ of this area is forested, due to clearing of the land for agriculture, fire, and grazing. This devastation began when a fanatical Christianity destroyed first the sacred groves and later extended its work to the mountain forests, which were regarded as haunts of pagan gods.—Oak, the most prominent genus in ancient Greece, is still supreme, with 15 species recognized. *Quercus conferta* and *Q. robur* are most frequent, but others are also widely scattered. Beech (*Fagus silvatica*) is second in importance to the oaks, followed by chestnut (*Castanea vesca*). Other hardwoods play minor rôles, including 2 species of elm (*Ulmus campestris* and *U. effusa*), 3 species of poplar (*Populus alba, P. nigra*, and *P. tremula*), 6 of maple (*Acer campestre* being the most prominent, followed by *A. creticum, A. monspessulanum, A. platanoides, A. reginae amaliae*, and *A. ricinifolium*. Alder (*Alnus glutinosum*) is found sparingly, as are also 2 ashes (*Fraxinus ornus* and *F. excelsior*) and sycamore (*Platanus orientalis*). Seven species of willow are found (*Salix alba, S. caprea, S. cinerea, S. fragilis, S. incana, S. purpurea, S. triandra*). Among conifers the Apollo fir (*Abies apollinis* or *A. parnassica*) is most important, yielding timber and a healing balsam. Amalia fir (*Abies reginae amaliae* or *Arcadica*) is also found, together with *A. panachaica* and *A. cephalonica*. This last species has suffered much from destructive lumbering during the past century but still occupies an area of about 12,000 hectares in the Aenos mountains. *Pinus laricio*, which goes by several popular names, is widely scattered throughout the mountains of Greece, usually in mixture with fir; it is widely used in shipbuilding. *Pinus maritima* is found near the coasts and on many islands and is frequently tapped for its resin. A 3rd species of pine, *Pinus pinea*, is now rather rare. It is famous for the flavor of the nuts. *Juniperus oxycedrus* and *J. macrocarpa* are found scattered throughout the mountains of Attica, while *J. communis, J. drupacea, J. nana, J. phoenica*, and *J. turbinata* are found only in the Peloponnesus and some of the islands. *J. foetidissima* is the only species forming pure stands. A general forest description of Mount Pentelicous is given. The organization of Greek forest administration is briefly outlined. The field organization fails to equal the "paper" organization and in general the work is not very well handled and Greece is to be classed as backward in forestry although progress is being made. As a result

of a recent Austrian mission to Greece under Dr. Stengel a higher forestry school has been founded at Athens, and a corps of men has been built up for torrent control work. The new laws provide further for the encouragement of private forestry, revise the whole state organization along modern lines, and provide for forest fire protection. The Austrian mission has also initiated growth and volume studies on the firs of Greece.—*F. S. Baker.*

704. Anonymous. **Price list of forest-tree transplants, ornamental shrubs, hedge plants and seeds obtainable from the forest nursery, Salisbury.** Rhodesia Agric. Jour. 17: 554–555. 1920.—Conditions under which shipments of young trees are made are stated. Forest tree transplants when ordered in quantities are grown and shipped in tins containing 4 to 25 plants in a tin. Prices of transplants and of seeds are given for a number of species.—*A. J. Pieters.*

705. Anonymous. **Terpentinöl, Harz und Fett aus einheimischen Nadelhölzern.** [Turpentine, rosin, and fat from native conifers.] Wiener Allg. Forst- u. Jagd Zeitg. 38: 325–326. 1920.—The author discusses recent articles dealing almost entirely with the extraction of resinous materials from wood chips, sawdust, etc., by distillation.—*F. S. Baker.*

706. Algan, H. [Rev. of: Huffel, G. **La forêt sainte de Haguenau en Alsace.** [The sacred forest of Haguenau in Alsace.] *6 fig.* Berger-Levrault: Nancy, Paris, and Strasbourg, 1920.] Bull. Trimest. Soc. Forest. Franche-Comté et Belfort 13: 289–296. 1920.

707. Balme, Juan. **Repoblando nuestro bosques, tendremos agua.** [Conserve the water supply by reforesting.] Rev. Agric. [Mexico] 5: 522–525. *3 fig.* 1920.—The Mexican forests are being rapidly cut to supply ties for the railroads and other demands for forest products. A plea is made for reforestation. *Eucalyptus* species are especially recommended for this purpose.—*John A. Stevenson.*

708. Barbey, A. **Die Rindenlaus der Weisstanne.** [The bark louse of the white fir.] Schweiz. Zeitschr. Forstw. 72: 147–151. *1 pl.* 1921.—It was generally conceded that the mixed forests and local groups of individual species in Switzerland were less subject to insect attack than the large areas of pure stands in Germany or Russia. However, during the past season alarming attacks of *Dreyfusia piceae* C. B. (*Chermes piceae* Ratz.), a relative of the German *Dreyfusia Nusslini* C. B., were noted in Jura and Aargau. The insect attacks the bark near the middle of the bole and farther up (also the smaller branches), causing drying and splitting of the inner bark and exudation of pitch. The tree finally dies, apparently from the drying of the wood rather than from the loss of leaves. The life history is not completely known. The spring form consists of dormant larvae and wingless females, and the summer form may be either the typical summer form or the migratory form of the female. A known remedy is to spray the summer form with a mixture of 1400 parts water, 30 of nicotine, and 100 of soap. The height at which the attacks are most serious makes spraying impracticable.—*J. V. Hofmann.*

709. Billmann, H. H. **Nogle Bemärkninger om Jordbearbeidning med Motorkraft.** [Notes on working the soil with motor power.] Dansk Skovforenings Tidsskr. 5: 226–230. *Pl. 2.* 1920.

710. Engler, Arnold. **Untersuchungen über den Einfluss des Waldes auf den Stand der Gewässer.** [Investigations to determine the influence of forests on stream flow.] Mitteil. Schweiz. Zentralanst. Forst. Versuchsw. 12: 1–626. *58 pl., 127 tables.* 1919.—The importance of the relation of forests and run-off has long been recognized. The effects of the forest have been noted in various localities, although the specific relations of complete forest cover, partial cover, and denuded areas were not determined. The objects of this experiment were to determine the comparative run-off on a forested area and a non-forested area, with all other conditions as nearly equal as possible during (a) heavy showers, cloud bursts, (b) continuous long periods of rain, (c) rapid melting of snow, and (d) periods of drouth. The experiment includes 2 watersheds known as the Sperbelgraben and the Rappengraben. The former

contains 137 acres and has a complete forest cover on 97 per cent of the area, and the latter contains 172 acres, of which 35 per cent is covered with forest and shrubs, 26 with willow, and 29 with alpine alder and spruce in meadows; 8 per cent is in meadow and 2 under cultivation. Soil, vegetation, slope, elevation, springs, and all noticeable factors were considered. The elevation varies from 912 to 1261 meters. On each watershed 3 rain guages were placed at different elevations with a snow stake at each station. In addition, 8 snow stakes were established in 1915, 4 on shaded slopes and 4 on sunny slopes. They were grouped in pairs under mature conifers and hardwoods and young growth. These stakes were read twice each week at 8–9 in the morning. Temperatures were recorded at the stations of Kurzeneialp and Riedbad. Thermometers were placed on the shaded side of wooden buildings and read 3 times daily. Stream flow was recorded automatically at each control station from April 16 to November 30 of each year. The automatic recorders could not be depended upon during freezing weather. Variations in underground drainage or supply of water are considered negligible. The springs of the Rappengraben area (non-forested) are slightly stronger and more constant. However, the run-off from the forested area (Sperbelgraben) was greater during the dry summer periods than that of the non-forested (Rappengraben) area. The records show a total of 4–5 per cent greater precipitation in the Rappengraben than in the Sperbelgraben; also, the former retained a cover of snow for 143 days, the latter only 121 days. These differences are attributed to the location of stations. The snow readings in the Rappengraben were taken in a cove and are considered due to local conditions. Water content of the soil in the Rappengraben was slightly less in summer and greater in the fall than in the Sperbelgraben. The retention of water in the dry season is attributed to porosity of soil and prevention of run-off due to soil looseness brought about by roots and forest animals; and the smaller amount of water in the soil of the forested area during wet seasons is attributed to the duff preventing absorption after the humus and duff are wet, thereby causing greater run-off.—Individual showers caused about 50 per cent more run-off on the Rappengraben than on Sperbelgraben and the duration of run-off on the non-forested area was shorter. Evaporation from the forest floor was 1230 cubic meters per hectare per year, and in the open 3690 per year. Transpiration from the forest per year per hectare was 3000 cubic meters, from the meadow and cultivated plants 1300, and from the willow areas 650. The disposition of precipitation is summed up in the following tabulation:

	Sperbelgraben; per cent of Precipitation	*Rappengraben; per cent of Precipitation*
Run-off........................	59.3	61.9
Evaporation from vegetation...	14.5	11.8
Transpiration..................	18.9	8.1
Evaporation from ground......	7.3	18.2
	100.0	100.0

Erosion was greater in the non-forested area and the stream carried more silt.—*J. V. Hofmann.*

711. GAJÓN, CARLOS. **Una Acacia rica en tanina. [An Acacia rich in tannin.]** Rev. Agric. [Mexico] 5: 442–443. *3 fig.* 1920.—A brief account is given of *Acacia pycnantha* Benth., including botanical description, cultural directions, and analyses of the bark.—*John A. Stevenson.*

712. HENNE, A. VON. **Einiges über den verteuerten Waldwegbau. [Concerning the cost of forest road building.]** Schweiz. Zeitschr. Forstw. 72: 129–140. 1921.—The cost of forest road building has increased about 33 per cent during the last 25 years. Although wages have increased as much as 92 per cent, transportation and other costs have increased only 23 per cent. Forest roads should be built with a view to permanency, not only for the regions that they traverse, but also as an outlet for adjoining regions and those farther back. Width should not be sacrificed for length, although narrow roads of 2 meters width are sufficient for winter sled roads. Wheel-traffic roads should be 2.5 meters wide with turnouts, or 3 meters wide. Rocky and gravelly places should not be covered with rock surface except on main highways.

etter satisfaction and cheaper construction can be obtained through the small contractor; he machinery of the large operator is too cumbersome and expensive.—*J. V. Hofmann.*

713. Hufnagl, Hans. Eine schwedische Kubikmassen-Ermittlungsmethode. [A Swedish method for determining volume.] Wiener Allg. Forst- u. Jagd Zeitg. 38: 331–332. 1920.—brief discussion is given of Prof. Tor Jonson's form factor methods and their basis.—*. S. Baker.*

714. Kopetzky, Eugen. Ein Vorschlag zur Beförsterungsfrage. [A suggestion for forest dministration.] Wiener Allg. Forst- u. Jagd Zeitg. 38: 243–244. 1920.—Owners of small roodlands are under considerable disadvantage in handling their holdings under the best iethods of forestry and also in selling their products. The cure for this condition is freuently expressed as the "Nationalization" or "Socialization" of the forests. The author oints out that the same ends may be accomplished through voluntary associations of small wners. Such associations might be loose at first and limited to cooperative purchases and mployment of technical help. These associations, however, are capable of development into ctual managers of the woodlands of the individuals on the basis of one large unit, thus securing very advantage that large forest owners have and also serving public interests much better. 'he formation of such associations can be stimulated by the extension of laws applying to arge forests to small holdings, forcing them to unite for economical compliance with these iws.—*F. S. Baker.*

715. Krarup. Sönderjydske Skovforhold. [Forest conditions in southern Jutland.])ansk Skovforenings Tidsskr. 5: 217–226. 1920.—The author gives areas and general descripion of the forests in Schleswig-Holstein, territory recently acquired from Germany. The astern forests are made up principally of beech, ash, and oak, with plantations of Sitka spruce nd Douglas fir. In the central and western parts there is a predominance of red spruce nd fir. These forests show the results of careless cutting incident to the demands of the war. 'ame animals are also considerably reduced.—*J. A. Larsen.*

716. Kreibich, M. Kapitalstilgung. [Amortization.] Wiener Allg. Forst- u. Jagd eitg. 38: 273–274. 1920.—Rules and formulae are presented for determining certain values requently needed but not included in tabular form, from values which are so given in the orester's handbooks or "calendars" current in Germany.—*F. S. Baker.*

717. Kreutzer, E. Neue Durch-forstungsgrundsätze. [New principles in thinning.] Viener Allg. Forst- u. Jagd Zeitg. 38: 324–325. 1920.—In Württemberg it has been the practice f most private forest owners to thin stands, particularly fir, too lightly in an attempt to get a iaximum number of stems per acre, and clear material rather than good crown development. 'his is intensified by the lack of a good market for poles removed in thinning. Crown width hould equal $\frac{1}{7}$ the height of the tree on site quality I, $\frac{1}{6}$ on quality II, and $\frac{1}{5}$ on quality III. 'he factors, 7, 6, 5, used above are employed as spacing indicators from which the number of tems per unit area can be obtained by dividing the height of the trees by the appropriate 'spacing indicator," and then dividing the area by the square of this quotient. The final ield in money depends upon basal area $\times$ height $\times$ form factor $\times$ value quotient. In practice he term "height times form factor" can be eliminated as it is nearly constant and attention iust be centered upon basal area and quality, which are dependent in turn upon the number of tems per hectare.—*F. S. Baker.*

718. Locker. Vorschläge zur Beförsterung. [Proposals for forest administration.] Viener Allg. Forst- u. Jagd Zeitg. 39: 18–19, 24–25. 1921.—The function of forests is to furnish rood, also protection to the soil, etc. In order to do this all forests should be under administration. In considering plans to accomplish this, 3 classes of forests may be recognized: .. Large private forests having wood production as their chief object. B. Encumbered orests, belonging to associations, cities, common property, etc., in which the object of ianagement is complex. C. Small wood lands (private). The first problem is personnel.

In forests of class A and B there should be a forester for every 600 to 5000 hectares, with an assistant for every 600 to 1500 hectares; while in class C forests, forester for every 5000–10,000 hectares is sufficient. In class A and B forests the plans of management as proposed by owners should be presented to District Foresters for approval, while in class C forests the government will initiate the plans. In the latter associations of forest land owners are very necessary to economical and easy administration. A full administration is outlined from State Forester down through various grades, together with councils of different degrees of authority. The distribution of costs of administration in different classes of forests and kinds of work is outlined.—*F. S. Baker.*

719. Muus, F. **Forsyndelser mod Skovnaturen ved vor Almindelige Skovdrift. [Sins against nature in our present forestry practice.]** Dansk Skovforenings Tidsskr. 6: 1–16. *Pl. 1.* 1921.—The present way of managing the forests by even-aged stands and clear cutting is detrimental to production because: (1) The soil is too much exposed to sun and wind, thereby losing the natural vegetation, moisture, and loose texture of the soil; (2) the borders of the forests suffer injury by exposure to sun and wind; (3) the openings incident to clear cutting retard growth of the younger age classes; (4) in the older high forests too many trees lack suitable light or space for ideal development; (5) the present practice places too much emphasis on direct sunlight; the diffuse light, shelter, and increased moisture of the soil secured by selection cuttings give better results. It is known that the 1st rotation after clear cutting produces poorer, shorter trees than the 2nd rotation in a natural forest. The author cites excellent results obtained by selection and shelterwood methods at Polenzka-Börenthoren in Germany, where since 1884 this method has increased the yield of the forest from 1.5 to 3.3 cubic meters per hectare per year, and raised the quality of the site from IV to II.—*J. A. Larsen.*

720. Muus, F. **Meddelelse fra Handelsudvalget. [Report of the Department of Commerce.]** Dansk Skovforenings Tidsskr. 5: 248–265. 1920.—Abstracts are presented dealing with prices, amounts, and general market conditions for lumber and fuel woods.—*J. A. Larsen.*

721. Podhorsky, J. **Der Wald als Regulator des Abflusses und Standes der Gewässer. [The forest as a regulator of the run-off of water.]** Wiener Allg. Forst- u. Jagd Zeitg. 38: 267–269. 1920.—The idea of control of torrential run-off by forests has been doubted lately in some quarters. The author undertakes to point out the definite advantages of run-off control through forests, by citing the work of the Swiss forest experiment station. The bulk of the article is a review of this work from the report of Arnold Engler [see Bot. Absts. 9, Entry 710].—*F. S. Baker.*

722. Rafn, Johannes. **Skovfröanalyser i Säsonen 1919–20. [Analyses of forest tree seeds 1919–20.]** Dansk Skovforenings Tidsskr. 6: 17–18. 1921.

723. Rittmeyer. **Der Schutzwald. [The protection forest.]** Wiener Allg. Forst- u. Jagd Zeitg. 39: 23–24. 1921.—The legal definitions of protection forests are reviewed and in all there is a clear intent to limit such forests to steep mountainous country where heavy cutting would result in avalanches, snowslides, and destructive erosion. The author proposes to extend the definition to cover all forest lands where reproduction is difficult, automatically restricting cutting in these lands to the degree allowed in the usual protection forests and thus assuring adequate reproduction. It is pointed out that many rocky, dry areas within forests are becoming treeless under present methods of cutting and are reforested only with extreme difficulty.—*F. S. Baker.*

724. S., A. **Valeur d'avenir. [Future value.]** Rev. Eaux et Forêts 59: 71–72. 1921.—In calculating the future value, as a basis for reparations, of trees destroyed by the Germans, it is helpful to make use of Pressler's famous trinomial $(a + b + c)$, in which a represents the per cent of current volume growth of the tree, b the per cent of increase in quality resulting from increase in size, and c the per cent of increase in value resulting from rising prices

of wood. Trees over 40 cm. in diameter usually have no future value because for larger trees *b* is negative, making the sum of $a + b$ less than *c*. The great and definitely known increase in price during the last seven years, however, gives a positive future value to trees up to 60 cm. in diameter. In the case of young oak standards for this period *c* amounts to 15 per cent, to which may be added 2 per cent for current annual volume growth (*a*), making a total of 17 per cent even if *b* is ignored entirely.—*S. T. Dana.*

725. Sammereyer, Hans. **Zirbenkulturen. [Swiss stone pine (P. cembra) culture.]** Wiener Allg. Forst- u. Jagd Zeitg. 38: 332–333. 1920.—*Pinus cembra* has good possibilities for planting in the Tyrol region. The wood is in high demand for charcoal in local smeleters and many high mountain forests have been devastated on account of this demand. Toward the upper range of fir and larch it is often difficult to get successful plantations, but the establishment of Swiss stone pine is easy, and larch and fir are later introduced with ease,—the stone pine is choked out in a few years. The real field of usefulness of the species is at higher elevations (above 1800 meters), where it is virtually the only species that develops rapidly. Planting is much superior to sowing on account of the abundance of rodents and birds which destroy the seed; but in exceedingly rocky sites a combination of sowing and planting seems best as seedlings can establish themselves among the rocks where holes cannot be dug. While this species succeeds in the open, it does much better in the protection of rocks, hummocks, and old stumps. Four to 6 year old seedling stock, as a rule raised in nurseries near the planting site, is generally used. Rodents and jays are the chief enemies of such nurseries; the former are combatted by the use of typhus bacilli, the latter by wooden lattice work over the beds.—*F. S. Baker.*

726. Sim, T. R. **Timber trees for commercial culture.** South African Jour. Indust. 3: 1030–1039. 1920.—A list is presented of trees that have been tried in Natal, with notes on success or failure.—*A. J. Pieters.*

727. Vestergaard, N. **Dansk Skovforenings Opvisning af Skovmaskiner og Redskaber i Haslev-Orned Skov den 17. April 1920. [Demonstration of machinery for use in forestry operations at Haslev-Orned forest April 17, 1920. Under auspicies of the Danish forestry association.]** Dansk Skovforenings Tidsskr. 5: 231–247. *Pl. 13.* 1920.

728. Weir, James R. **The mucilage of mistletoe berries as an adhesive.** Phytopathology 11: 99. 1921.—A method is given for the preparation of mucilage from the berries of *Phoradendron*, *Viscum*, and related genera.—*B. B. Higgins.*

GENETICS

George H. Shull, *Editor*

James P. Kelly, *Assistant Editor*

(See also in this issue Entries 587, 594, 596, 598, 603, 613, 617, 627, 630, 639, 647, 685, 695, 697, 785, 789, 792, 807, 816, 823, 832, 840, 851, 871, 876, 941, 1100)

729. Anonymous. **Mutations and evolution.** [Rev. of: Gates, R. **Mutations and evolution.** New Phytol. 19: 26–34, 64–88, 132–151, 172–188, 213–253. 1920.] Nature 107: 636–637. 1921.

730. Anonymous. **The pollination of Incarvilleas.** [Rev. of: Cutting, E. M. **On the pollination mechanism of Incarvillea Delavayi, Franch.** Ann. Botany 35: 63–71. *3 fig.* 1921.] Gard. Chron. 69: 97. 1921.

731. Agar, W. E. **Cytology with special reference to the metazoan nucleus.** *xii + 224 p.* Macmillan & Co.: New York and London, 1920.—A condensed general treatise on the subject indicated by the title is presented. The author contrasts parasyndesis and telosyndesis,

considering the former proven, the latter perhaps possible in some organisms. "Mutual relations of chromosomes" in syndesis are discussed, it being considered probable that homologous chromosomes fuse at this time. Syngamy, gonomery, and fragmentation of chromosomes are discussed; also parthenogenesis—facultative and obligatory, haploid and diploid. Cases are cited of diploid parthenogenesis with 2 maturation divisions (*Nematus*, *Rhodites*). Sex chromosomes in insects are considered in detail and compared with those of other animals. Special life histories are described; alternation of parthenogenetic and sexual generations are considered with reference to chromosome behavior. Relation between sex chromosomes and sex determination are briefly considered with the conclusion that in every individual "both sexes must be considered as potential," but in most cases sex chromosomes are "overwhelmingly the most important immediate factor in sex determination." In rare cases, "other factors may be more powerful." Actual influence of sex chromosomes in determining sex is unknown, but the result is probably not due to differences in the mass (amount) of chromatin. Sex is probably due to hereditary factors residing in the chromosomes. Evidence for genetic continuity of chromosomes is reviewed and the principle is accepted. Homology of chromosomes is discussed. Possible modes of evolution of chromosomes are considered, i.e., fractionation, fusion, tetraploidy, etc. The author reviews evidence indicating that chromosomes are the main vehicles by which "hereditary qualities are transmitted from parent to offspring," and that they initiate and control activities of cell and morphogenesis. A discussion of chromosomal behavior in hybrids is included; also a brief treatment of crossing over and mutation phenomena including somatic mutations. Morphogenesis is immediately affected by "organ-forming substances" of cytoplasmic nature, but is ultimately controlled by the nucleus. Chromidia are considered, with the conclusion that their origin is in doubt and their function not clear. Chondriosomes, which may be identical with chromidia, are likewise of doubtful origin; there is practically no evidence that they reproduce regularly by fission or that they are equally and regularly distributed in cell division. They are probably not the seat of morphogenetic factors, and are not, on the basis of present knowledge, to be considered as idioplasmic. The final chapter is devoted to nuclei of Protista and plants. Chromatin-cytoplasm differentiation may be lacking in some bacteria. "Modes of nuclear multiplication in the Protista are of bewildering variety." Recent evidence renders supposed cases of amitosis in Protista doubtful. Likewise the supposed non-qualitative divisions of chromatin by means of chromidia are somewhat doubtful. Polyploid nuclei occur in certain stages of some Protista; e.g., the radiolarian *Aulacantha* has one chromosome in some nuclei, over 1,000 in others; both types apparently carry a full set of hereditary factors. Meiotic phenomena in plants are essentially similar to those in animals. Differences between animals and plants are discussed, especially variations in prominence of haploid (gametophyte) generation in plants. [See also Bot. Absts. 7, Entry 850.]—*C. W. Metz.*

732. Alverdes, Friedrich. **Zum Begriff der Scheinvererbung.** [The concept of false heredity.] Zeitschr. Indukt. Abstamm.- u. Vererb. 25: 164–169. *3 fig.* 1921.—The term "false heredity" is applied to a change produced in a line of descent by changed surroundings, which change remains for as many generations as the change in the surroundings persists so that the line of organisms comes back to normal only when, or a few generations after, the surroundings again become normal. Thus, non-heritable changes are classed as changes in the environment, and heritable changes as changes of the genotype. The problem of inheritance of acquired characters therefore becomes the problem of changes in the genotype produced by changes in the surroundings.—*John Belling.*

733. Bannier, J. P. [Dutch rev. of: Allen, E. J., and E. W. Sexton. **Eye-colour in Gammarus.** Jour. Genetics 9: 347–366. *1 pl., 1 diagram.* 1920 (see Bot. Absts. 7, Entry 840).] Genetica 3: 63–64. 1921.

734. Bannier, J. P. [Dutch rev. of: Jones, D. F. **Selective fertilization in pollen mixtures.** Biol. Bull. [Woods Hole] 38: 251–289. 1920 (see Bot. Absts. 6, Entry 1699).] Genetica 3: 68–70. 1921.

735. BAUMANN, E. **Zur Frage der Individual- und der Immunitätszüchtung bei der Kartoffel.** [The question of individual selection and breeding for immunity in potatoes.] Fühlings Landw. Zeitg. 67:246. 1918.—An analysis of the difference in yield shown by 2 potato varieties, "Auf der Höhe" and "Industrie" is presented. Industrie was more consistent in yield, showing an average range in yield per plant in grams of 380 as compared with 580 for Auf der Höhe. This difference was ascribed to a lessened influence of environment on the former variety.—Differences in degree of resistance to diseases were also quite marked. Auf der Höhe was affected with chlorosis and *Phytophthora*, while Industrie showed curly-dwarf and mosaic; both varieties were affected with leaf roll. Diseased plants of Auf der Höhe, however, showed only about ½ as much reduction in yield as diseased plants of Industrie when compared with healthy plants of the respective variety.—The author emphasises the need of thorough study of the morphological and physiological characters of the numerous varieties on the market to determine the most resistant and highest-yielding ones.—*C. M. Woodworth.*

736. BAUR, E. [German rev. of: FRUWIRTH, C. **Handbuch der landwirtschaftlichen Pflanzenzüchtung. Allgemeine Züchtungslehre der landwirtschaftlichen Kulturpflanzen.** (Handbook of agricultural plant breeding. General genetics of agricultural plants.) *xviii + 442 p., 8 pl., 89 fig.* Parey: Berlin, 1920.] Zeitschr. Bot. 13: 313–314. 1921.

737. BECKER, WERNER H. **Was wird aus den Kindern alter Erstgebärender? Ein Beitrag zur Vererbungslehre.** [What becomes of the children of mothers who bear their first child late in life? A contribution to genetics.] Arch. Rass.- u. Gesellschaftsbiol. 13: 277–297. 1921.—Do the offspring of parents of advanced age possess a neuropathic constitution? Data were collected by mail from women (mothers) who had visited the clinic at Giessen University. Eighty-five were primipara, 35 years old or over; and of these 62 were married. Among the 85 there were 17 still births,—a rate about 6 times higher than that of all first births in Berlin (1898) (—WINKEL). The sex ratio was 47 males to 39 females. The birth weight was on the average slightly less than that of early first born. According to the answers to the questionnaire, 24 children were normal, 3 imbecile, 3 epileptic, and 7 psychopathic. The author gives 16 additional cases of histories collected from physicians. He considers briefly the biological meaning of his results, but draws no general conclusions. His data are presented in detail.—*C. C. Little.*

738. BLACKBURN, KATHLEEN B., AND J. W. HESLOP HARRISON. **The status of the British rose forms as determined by their cytological behavior.** Ann. Botany 35: 159–188. *Pl. 9–10, 5 fig.* 1921.—In the rose the fundamental chromosome number is 7. *Rosa arvensis* and *R. rugosa* are diploid types; *R. pimpinellifolia* and all of the Villosae are tetraploid; the Eucaninae, Afzelianae, Rubiginosae, and Tomentosae are pentaploid; and a hybrid of *R. pimpinellifolia* × *R. tomentosa* var. *sylvestris* is found to be hexaploid. All of the diploid types examined are found to be of normal behavior during meiosis. Most of the tetraploid forms and all of the pentaploid and hexaploid ones show a partial reduction involving 14 or 28 chromosomes. In these groups the heterotypic division is equatorial as far as the bulk of its chromosomes is concerned but reductional with a fixed proportion, generally 14 and sometimes 28. The anaphase of the heterotypic division occurs in 2 steps, one involving the reduction and the other the splitting of the univalent chromosomes. In many cases the split univalent chromosomes fail to reach the poles, and form micronuclei. Multinucleate pollen grains are common in the anomalous forms of the genus. Known hybrids in many genera exhibit the same type of abnormal behavior as is shown by these forms of roses. The close similarity between the two leads the authors to the statement that every rose studied, showing partial reduction, is of hybrid origin. All of the abnormal roses are facultatively apomictical, and this is attributed to latent hybridity. Natural hybrids are instrumental in building new microgenes (Jordanian species) of the rose. [See also Bot. Absts. 9, Entry 745.]—*A. C. Fraser.*

739. BORING, EDWIN G. **Predilection and sampling of human heights.** Science 52: 464–466. *1 fig.* 1920.—The author presents a distribution of the heights of 221,819 men (insurance data) and shows that the curve has a remarkable inversion near the peak, there being fewer

men of height 5 ft. 9 in. than there are of height 5 ft. 8 in. or 5 ft. 10 in. He shows that this is not due to the inclusion of men of different ages, since it occurs in 10 of the 13 age groups (5-year groups) taken separately. He also points out that it is not due to a predilection for even heights. The instance shows how difficult it is to obtain an "unselected sample" by merely securing large numbers without scientific control of the original observations.—*L. J. Reed.*

740. BRIDGES, CALVIN B. **Gametic and observed ratios in Drosophila.** Amer. Nat. 55: 51–61. 1921.—Lack of correspondence between gametic series and observed classes in genetic work with *Drosophila* depends largely on 3 factors: (1) The viability of the mutant type and character combination; (2) the suitability of the culture medium and other environmental conditions; (3) the competition due to over-crowding. The last can be met by concentrating on a few cultures in which food is provided in abundance. To meet (2), it has been found that a 1 per cent banana agar (equal amounts of banana and water) gives the most satisfactory culture medium for breeding large numbers of flies. For lessening or eliminating the effects of poor viability of certain mutant characters or character combinations, the most successful method found is that of making up "alternated stocks" such that the characters are divided as evenly as possible between the 2 parents of the cross. When the F_1 progeny are back-crossed to the multiple mutant stock, their offspring, from which the linkage ratios will be calculated, show a very small percentage of inviable combinations, and these tend to balance each other. Such methods are constantly making the genetic results in *Drosophila* more accurate.—*H. H. Plough.*

741. CLEGHORN, MAUDE L. **First report on the inheritance of visible and invisible characters in silkworms.** Proc. Zool. Soc. London 1918: 133–146. 1918.—Crossing multivoltine and univoltine races resulted in producing F_1 generations which differed from each other in that these generations were multivoltine or univoltine depending upon the character of the mother, that is, each of these generations followed the female parent. The results of numerous crossings of various kinds lead the author to conclude that the maternal parents are dominant in the univoltine and multivoltine character, respectively, and that these characters are inherited from the paternal grandparent in which they were dominant characters. Crossing races differing in cocoon size resulted in producing largest average size of cocoons in every 3rd generation. Crossings for cocoon (silk) color show that the inheritance of this character is clearly Mendelian.—*Vernon Kellogg.*

742. DETLEFSEN, J. A. **Is crossing over a function of distance?** Proc. Nation. Acad. Sci. [U. S.] 6: 663–670. 1920.—It is a current concept of recent genetics that genes may be given definite loci on chromosome maps, on the basis of the percentage of crossing over between them. It is believed that these maps roughly indicate the actual distances apart of the genes in the chromosome. Certain experiments involving selection of strains of *Drosophila* showing high and low crossing over between white and miniature in the sex chromosome throw doubt on the validity of this hypothesis. The stock originally showed about 33 per cent crossing over, but as a result of selection in a minus direction this percentage was reduced to 0 (no crossing over) in 10 generations in 1 line, and to 6 after 28 generations in another. These stocks when inbred continued to give this reduced percentage of crossing over. Selection for increased crossing over was ineffective. Crosses of a strain giving 6 per cent crossing over with the original stock gave F_1 females which showed a percentage about midway between the two. The evidence indicates that the percentage of crossing over in this case is a "variable which is determined by the different possible combinations of multiple modifying factors." The author concludes that "crossing over is not necessarily proportional to distance," that "distance between two genes may remain fairly constant, but the amount of crossing over depends on numerous hereditary factors."—*H. H. Plough.*

743. FEDERLEY, HARRY. **Die Bedeutung der polymeren Faktoren für die Zeichnung der Lepidopteren.** [The significance of polymeric factors for coloration in Lepidoptera.] Hereditas 1: 221–269. *9 fig.* 1920.—The black aberration, *zatima*, of the arctiid moth, *Spilosoma*

lubricipeda, crossed with the yellowish-white type produces var. *intermedia*, which inbred gives a 1:2:1 ratio (1 *zatima*, 2 *intermedia*, 1 *lubricipeda*). A single factor, *Z* or *z*, differentiates them, promoting the development of black pigment much more vigorously in the homozygote than in the heterozygote. The great variability of *intermedia* and of *zatima*, and the rapid + or − effect of selection in a series of either variety, leads to the conclusion that a series of polymeric (modifying) factors influence *Z* in such wise that in *Zz* (*intermedia*) they act strongly, in *ZZ* (*zatima*) less strongly, and in *zz* (*lubricipeda*) negligibly; the number of these factors has not yet been determined. They control the distribution of the black pigment in different ways and hence are not homomeric. Evidences of action of polymeric factors were seen also in *S. menthastri*, *Cerula furcula*, and the *Leucodonta bicoloria-albida-unicolora* series.—Consideration of polymeric factors in moths leads to the conclusion that species are only apparently constant, consisting mainly of complex heterozygotes. Rare combinations of genes give "varieties"; the rarest, "aberrations." Homozygous combinations of polymeric factors, either dominant or recessive, producing the most extreme biotypes, occur in nature only with extreme rarity.—Critical examination of the supposed production of aberrations in *Arctia caja* by exposing pupae to cold shows that this genetically highly variable form is most unfavorable for such experiments, that the subsequent inheritance under normal temperatures by a few individuals of the aberrations supposed to be due to cold or heat is due to the combination in these individuals of polymeric intensity factors and is not "inheritance of acquired characters."—Selection for homozygous *zatima* soon reaches its limits; wing veins remain white. Hence the completely black aberration, *deschangei* Depuiset, is probably due to a special gene, not the result of cumulative selection of polymeric factors.—*Zatima* was recorded in 1782, *intermedia* not till 1890–1899, and the author assumes that the earliest described *zatima*, unlike most melanics on first appearance, was homozygous [though dark *intermedia* individuals are as black as *zatima*]. Polymeric factors so alter the phenotype as literally to change white into black and lead to false conclusions regarding environmental versus hereditary control of development, especially in man and other mammals which afford relatively small numbers of individuals of the stock in question.—*John H. Gerould.*

744. FRETS, G. P. [Dutch rev. of: BRYN, H. **Trondelagens Antropologi. (Anthropology of Trondhjem.)** K. Norske Videnskab. Selskab. 1917. IDEM. **Researches into anthropological heredity.** Hereditas 1: 186–212. 1920 (see Bot. Absts. 7, Entry 1732).] Genetica 3: 66–68. 1921.

745. HARRISON, J. W. HESLOP. **The genus Rosa, its hybridology and other genetical problems.** Trans. Nat. Hist. Soc. Northumberland, Durham, and Newcastle-upon-Tyne 5: 244–298. *Pl. 8–22, 2 fig.* 1921.—A study of a few closely related species of roses along with their allied forms from various sections of the country shows that the types merge imperceptibly into each other, thus forming a "linked-up series of groups," with each group separable from its neighbors by its own special characters. Further investigation shows that these chains of groups are of common occurrence. Each chain is definitely divided from the next. The writer considers each of these chains as being very close to a species in the Linnaean sense, though he believes that most taxonomists would accord them the rank of a section or subsection. The members of the chain are here considered as Jordanian species, or "microgenes," as the writer calls them. The chains are called "section-species." Eight of these section-species are recognized. Each species type is common to all section-species, seeming to indicate an orthogenetic trend of development in the evolution of the rose. Thus a table can be constructed, similar to MENDELEJEFF's Periodic Table, with the section-species as vertical groups and the species types as horizontal groups.—A careful study of the pollen of a number of roses reveals the fact that of 36 wild species and 2 garden hybrids produced from wild species, only 4 possess perfect pollen, while 75 per cent of them have less than half their pollen grains perfect, and about 40 per cent of them have less than 10 per cent of pollen capable of fertilizing ovules. Seven forms produced practically no good pollen. The conclusion is reached that pollen sterility is the outcome of latent hybridity. The pollen of *R. rugosa* and *R. cinnamomea*, 2 fairly well isolated species, seems to be largely perfect. In default of out-

side agencies, there is an automatic self-pollination of flowers in the rose at an early hour in the morning. While cross-pollination can occur, there is a surprising amount of selfing, much of it being accomplished by thrips. A number of cleistogamous flowers were found in *R. omissa.* Experiments have shown that practically all of the local rose microgenes depend upon self- or cross-pollination for the setting of seed and in the event of failure of these are, to some extent, facultatively apomictical. Dingler has already demonstrated apomixis in a form of *R. rubiginosa,* and Lundström in *R. glauca* and *R. coriifolia.* The writer holds that such apogamy as is found in the rose has its origin in hybridity. Some polyembryony is reported and various natural hybrids of roses are described. [See also Bot. Absts. 9, Entry 738.]—*A. C. Fraser.*

746. Herwerden, M. A. van. [Dutch rev. of: Seiler, J. **Geschlechtschromosomen-Untersuchungen an Psychiden. I. Experimentelle Beeinflussung der geschlechtsbestimmenden Reifeteilung bei Talaeporia tubulosa Retz. (Sex chromosome investigations on psychids. I. Experimental influencing of sex-determining maturation division in Talaeporia tubulosa Retz.)** Arch. Zellforsch. 15: 249–268. *1 pl.* 1920 (see Bot. Absts. 7, Entry 1836).] Genetica 3: 79–81. 1921.

747. Höppli. [German rev. of: Christeller, E. **Untersuchungen an künstlich hervorgebrachten Hermaphroditen bei Schmetterlingen. (Investigations on artificially produced hermaphrodites among Lepidoptera.)** Schrift. Phys. Ökonom. Ges. Königsberg 59: 1918.] Centralbl. Allg. Path. 30: 512–514. 1920.

748. King, Helen Dean. **A comparative study of the birth mortality in the albino rat and in man.** Anat. Rec. 20: 321–354. 1921.—The normal percentage of still births in rats for 31,670 births is 1.31. After correction, 2 per cent seems the high limit. For man numerous data ranging from 3.04 per cent to 5.67 per cent are given. The indications are that in higher mammals from 2 to 4 per cent of full-term fetuses are dead. The sex ratio of normal living rats is apparently 104.1 males to 100 females; this, however, is subject to corrections which makes 107 a more nearly correct estimate. In 415 still births (same material) the sex ratio was 129.3. The human sex ratio of living births shows a norm of about 105.5. The sex ratio of 13,635,986 still births (Nichols) is 131.6. The author estimates the primary sex ratio and criticizes Morgan's hypothesis to explain the constant sex ratio in man. He also considers the evidence that the season influences the percentage of still births but concludes that such influence is negligible. In rat and man early postnatal mortality is about the same and is "somewhat higher" than the birth mortality. Causes and extent of birth mortality are given as follows: (a) Malposition of fetus and disease, about 1 per cent of human fetuses (Mall) but very rare in rats,—4 in 50,000. (b) Size of fetus, "important" in humans but not operative in rats. (c) Physical condition of mother, probably important in rats. (d) Age of mother: Very old rats and both very young and very old human mothers appear to give higher percentage of still births than those at zenith of reproductive period. (e) Congenital debility, over 50 per cent in humans and "practically all" cases in rats. The author discusses the control of percentage ofstill births and believes fetal nutrition to be an important factor; age of mothers is probably operative as a factor through this same medium of nutrition. Since the earlier the embryonic age, the greater the excess of male abortions that occur, "inadequate nutrition cannot be considered as the primary cause of the greater mortality among male fetuses in general." Lillie's hypothesis of influence of sex hormones of mother on mortality of male fetuses is discussed. Inherent dissimilarity of sexes as regards constitutional vigor may have a basis in the amount of chromatin possessed by the ovum. The assumption is made that, from conception, the embryo that is to be a male has a constitution "inherently weaker" than the embryo that is to become a female; on this basis experimental facts may be explained.—*C. C. Little.*

749. Koltonski, Hermann. **Über Erblichkeit der Ovarial-, besonders der Dermoidcysten. [On the inheritance of ovarial cysts, especially the dermoid cysts.]** Zeitschr. Krebsforsch. 17: 408–416. 1920.—Five patients belonging to 2 families are considered. I. (a)

Female, 44 years old (father and 3 sisters out of 5 sibs have died of carcinoma of the digestive tract). Both ovaries were enlarged, cystic, left side having dermoid cyst with hair, pulp, teeth, and a dermoid villus.—(b) Female, 19, daughter of (a), had cyst on left side, behind uterus,—right ovary the size of a hen's egg, not adherent, with smooth, walnut-sized cyst on lateral half. The larger cyst, excised, showed, on sectioning, oily pulp with short black hairs, and a piece of bone developed from cartilage, with two teeth. The author discusses the probability of inheritance.—II. (a) Female, 41 years old. From the rear end of the uterus a subserous myoma, the size of a goose egg, occurred.—(b) The 15-year-old daughter of II (a). An operation revealed a dermoid cyst on the right side as large as a man's head, and, over it, the thickened tube. Most of the tumor was cystic with serous contents; only in one place was dermoid pulp and a villus present.—(c) The sister of II (b) had a parovarial cystic tumor (the size of a child's head), which was excised with the tube.—The author considers the theories of the origin of the 3 types of tumors here considered. He believes that they may support Billroth's hypothesis of a general cancer diathesis. This theory and the possible factors underlying tumor formation are discussed. The author believes that there is an hereditary disposition to tumor formation which is general in nature,—the type of tumor in the special case being due solely to chance.—*C. C. Little.*

750. Lek, van der. [Dutch rev. of: Nilsson-Ehle, H. **Über Resistenz gegen Heterodera Schachti bei gewissen Gerstensorten, ihre Vererbungsweise und Bedeutung für die Praxis. (On the resistance to Heterodera Schachti in certain varieties of barley, its method of inheritance, and significance for agricultural practice.)** Hereditas 1: 1–34. *4 fig.* 1920 (see Bot. Absts. 6, Entry 1731).] Genetica 3: 71–72. 1921.

751. Loeb, Jacques. **Further observations on the production of parthenogenetic frogs.** Jour. Gen. Physiol. 3: 539–545. *3 fig.* 1921.—Over 20 parthenogenetic frogs, produced by puncturing unfertilized eggs, have been raised to advanced and adult stages. The occurrence of both sexes suggests that, in the frog, the female is heterozygous for sex. The males possess 26 chromosomes, the diploid number. Accidental fertilization of eggs was excluded by mode of procedure and only the punctured eggs developed. The diploid number may have been produced either by retention of the second polar body or premature division of chromosomes without cell division. The number of chromosomes in female parthenogenetic frogs is unknown but both diploid and haploid numbers have been reported from tadpoles too young for sex determination. Many parthenogenetic tadpoles did not metamorphose although growth was normal. One over a year old was made to metamorphose in 2 weeks by feeding thyroid gland from cattle.—*J. L. Collins.*

752. Lotsy, J. P. [Dutch rev. of: Sakamura, T. **Experimentelle Studien über die Zell- und Kernteilung mit besonderer Rücksicht auf Form, Grösse und Zahl der Chromosomen. (Experimental studies on cell division and nuclear division with special reference to form, size, and number of the chromosomes.)** Jour. Coll. Sci. Imp. Univ. Tôkyô 39^{11}: 1–221. *7 pl., 24 fig.* 1920 (see Bot. Absts. 7, Entry 1844; 8, Entry 330).] Genetica 3: 72–77. 1921.

753. Malinowski, Edmund. **Die Sterilität der Bastarde im Lichte des Mendelismus. [The sterility of hybrids in the light of Mendelism.]** Zeitschr. Indukt. Abstamm.- u. Vererb. 22: 225–235. 1920.—The author made crosses between different types of *Triticum vulgare* and *T. dicoccum* and determined the degree of fertility of the offspring by dividing the number of seeds by the number of spikelets in the head. F_1 was morphologically intermediate between the parents. In F_2, new forms appeared, whose characters were inheritable. F_2 showed more partly or wholly sterile plants than fertile, and the greatest number of individuals with relatively high degree of sterility. The results show very little evidence of interdependence between morphology and sterility. A study of F_3 shows that different degrees of partial sterility are inheritable.—The author criticises Belling's theory that sterility in hybrids is due to the genetic composition of individual spores or gametes and proposes instead the theory of genes or inharmonious elements meeting in a hybrid which act as complements to produce

partial impotence of the plant as a whole. The impotence of individual spores and gametes is hence considered to be independent of their own composition. The grade of impotence is assumed to be determined for the zygote as an individual, and the association of a lesser or greater number of pairs of complementary genes decreases or increases the impotence.—*Hester M. Rusk.*

754. Malinowski, Edmund. **Studya nad Mieszancami Pszenicy.** [Studies on wheat hybrids.] Prace Towarzystwa Naukowego Warszawskiego 30. *290 p., 10 pl., 33 fig.* 1918. [Polish, with French translation.]—A study of crosses of lax, squarehead, and compact types of *Triticum vulgare*, with lax, square, and semicompact types of *T. dicoccum*. Seventeen crosses are described as to their behavior in F_1 and F_2. Ninety-six selected F_2 progenies are described in the F_3. Aside from the parental types, other forms appeared in the F_2,—*Triticum spelta*, *T. turgidum*, *T. durum*, some very similar to *T. polonicum*, and 2 new forms, *T. ellipsicum* and *T. lanceolatum*. All these forms are distinguishable by the shape and size of their glumes and spikelets. The author attributes the size and shape of the glumes and spikelets to the presence or absence of cumulative factors. Size and shape of grain are related to the size and shape of the glume. Partial or complete sterility is explained on the basis of Mendelism through 2 or more discordant factors meeting in the same individual. The degree of sterility depends on the number as well as the quality of these factors. Three types of inheritance are obtained as regards length of head, giving ratios of 1 : 2 : 1, 3 : 1, and 15 : 1. These are found by intercrossing to be related and the factors concerned are complementary.—*R. Summerby.*

755. Marie-Victorin, Fr. **La vie sexuelle chez les Hydrocharitacées.** [The sexual life of the Hydrocharitaceae.] Nat. Canadien **45**: 130–133. 1919.—The method of pollination in *Vallisneria* is discussed, comparing the statements of Mignault [see Bot. Absts. 3, Entry 1112] with the generally accepted ideas. The author describes the liberation and opening of the staminate flowers of *Philonotria canadensis* (Michx.) Britton (*Elodea canadensis* Michx.) and the opening and pollination of the pistillate flowers, his observations agreeing essentially with those of Wylie (The morphology of *Elodea canadensis*. Bot. Gaz. **37**: 1–22. 1904). [See also Bot. Absts. 3, Entry 1111.]—*C. E. Allen.*

756. Morgan, T. H. **Variation in juvenile fiddler crabs.** Amer. Nat. **55**: 82–83. 1921.—The author replies to Miss Rathbun's criticism [see Bot. Absts. 9, Entry 759] of his former paper (Amer. Nat. **54**: 220–240). He states that these "small crabs with narrow abdomen were stated in my paper to show either a change toward maleness or possibly a retention of the juvenile condition," that out of more than 3000 individuals that were collected only a few showed the narrow abdomen, and that with considerable reservations he had ventured to call these intersexes because the variation in question was in the direction of a character peculiar to the opposite sex.—*A. M. Banta.*

757. Northrop, John H. **Concerning the hereditary adaptation of organisms to higher temperature.** Studies Rockefeller Inst. Med. Res. **36**: 259–264. 1921.—Reprinted from Jour. Gen. Physiol. **2**: 313–318. 1920 [see Bot. Absts. 5, Entry 433].—*Geo. H. Shull.*

758. P[openoe], P[aul]. [Rev. of: Gruenberg, Benjamin C. **Elementary biology.** *x + 528 p., 26 fig.* Ginn & Co.: Boston, 1919 (see Bot. Absts. 3, Entry 1902).] Jour. Heredity **12**: 41. 1921.

759. Rathbun, Mary J. **On intersexes in fiddler crabs.** Amer. Nat. **55**: 80–82. 1921.—The author criticizes Morgan's interpretation of exceptional fiddler crabs as intersexes rather than juvenile states, asserting that he has ". . . . thereby seemingly robbed the female fiddler of its period of adolescence." [See also Bot. Absts. 9, Entry 756.]—*A. M. Banta.*

760. SCHWEISHEIMER, W. **Bevölkerungsbiologische Bilanz des Krieges 1914-19.** [Population effects of the war 1914-1919.] Arch. Rass.- u. Gesellschaftsbiol. 13: 176–193. 1920.—This paper reports studies of the effect of the world war on population, considering losses both from deaths and from decrease of births. Tables are given to show the losses under these heads for all of the important countries of Europe. The last part of the paper is devoted to a discussion of the ratio of males to females, showing the decrease in the ratio between 1913 and 1919.—*L. J. Reed.*

761. SIRKS, M. J. [Dutch rev. of: SCHMIDT, JOHS. **Racial investigations. IV. The genetic behavior of a secondary sexual character.** Compt. Rend. Trav. Carlsberg Lab. 14[8]: 1–12. *Pl. 1–5 (colored).* 1920.] Genetica 3: 77–79. 1921.

762. SKUPIENSKI, F.-X. **Sur la sexualité chez une espèce de Myxomycète Acrasiée, Dictyostelium mucoroides. [Sexuality of a species of Acrasiales, Dictyostelium mucoroides.]** Compt. Rend. Acad. Sci. Paris 167: 960–962. 1918.—The germination of the spore (in culture) is followed immediately by a motile amoeboid stage. There is no ciliated phase. The myxamoebae multiply, the nuclear division being karyokinetic, the chromosome number 4. After a series of divisions, the uninucleate myxamoebae, now relatively large and vacuolate, become arranged in pairs and fuse. Fusion of the cytoplasm is followed by that of the nuclei. The zygotes become massed together and sporulation follows.—*C. E. Allen.*

763. SLOCUM, R. R. **Methods of pedigree breeding at the government poultry farm.** Amer. Poultry Advocate 28: 435–437. *8 fig.* 1920.—A brief popular article that contains nothing new.—*H. D. Goodale.*

764. SMITH, W. G. **Special strains of medicinal plants by selection.** Pharm. Jour. 104: 116–117. 1920.—The present paper is a summary of a semi-popular lecture on breeding medicinal plants. Principles and methods used in agricultural plant breeding are summarised as follows: (a) Standard species, as of *Digitalis* and *Belladonna*, are composed of many varieties which show great diversity when studied intensively; (b) internal qualities are rarely changed by cultivation, fertilization, etc.; (c) improvement within species is obtained by selecting and propagating the best individuals; (d) better results have been obtained by selection of single plants giving rise to pure lines, as for instance in the sugar beet; (e) production of new combinations by hybridization may lead to improvement in any required direction.—To illustrate these principles and methods the author mentions marked improvement and rise in price of French lavender. Strains such as *Lavendula vera fragrans* and *L. vera delphiniensis* produce the finest oil and thrive at both low and high altitudes. *L. spica*, a native of lower altitudes, yields very inferior oil, as does the hybrid, *L. vera* × *L. spica*. The superiority of English lavender is probably due to long and intensive observation and selection. The standard of yield has been greatly increased where selection of races has been practiced. An effort began in 1904 to improve Hungarian oil of peppermint, resulting in a yield of 62–71 per cent of laevocarvone in Hungarian oil of *Mentha crispa*, as compared with 35–56 per cent in American, 35–56 per cent in German, and 5–10 per cent in Russian. Hungarian oil of *M. piperita* yields 43–56 per cent free menthol and 35–65 per cent total menthol, as compared with American oil, *M. piperita* yielding 40–45 per cent free menthol and 60 per cent total menthol. *M. piperita* has been shown by CAMUS to be a hybrid between *M. viridis* and *M. aquatica*, which thus explains its wide range of variation. The variety "Red mint," cultivated in France and coming more into use, has been found to grow where true peppermint cannot grow, and in the same field for 4 or 5 years, while true peppermint can be grown but 2 years on the same ground. "Red mint" gives a high yield but the oil is of inferior quality. Possibility in improvement is indicated by the great variation in *M. piperita*.—In America, by selection, belladonna, normally yielding 0.23 per cent alkaloid, has been made to yield 0.55 per cent; strains yielding 0.43 per cent have been made to yield 0.72 per cent; and those yielding 0.62 per cent have been selected to yield 0.87 per cent. By selection, strains of *Datura* normally yielding 0.34 and 0.35 per cent of alkaloid have been improved to yield 0.53 and 0.56 per cent respectively. [See also Bot. Absts. 6, Entry 825.]—*Francena R. Meyer.*

765. SOLER, RAPHAEL ANGEL. **Cultivo del tomate.** [Tomato culture.] Rev. Agric. Com. y Trab. [Cuba] 2: 479–483. *4 fig.* 1919.—Progress is recorded in selection, 1917–1919, from semi-wild plants, the original stock of which is supposed to have come from the Canary Islands, 1849 or 1850. There were 3 types of tomato,—plum, pear, and ribbed. From the ribbed of the 3rd crop the author selected several strains differing in smoothness of skin and size. The selection was carried out for good salad size and for condiment. A table gives data of the 3rd crop for number of fruits and total weight in the following classes: Large salad size, commercial or cooking, large pear, small pear, plum.—*E. E. Barker.*

766. TISCHLER, G. [German rev. of: HERTWIG, G., UND P. HERTWIG. **Triploide Froschlarven.** (Triploid frog larvae.) Arch. Mikrosk. Anat. 94: 34–54. 1920.] Zeitschr. Bot. 13: 321–322. 1921.

767. TISCHLER, G. [German rev. of: ROSENBERG, O. **Weitere Untersuchungen über die Chromosomenverhältnisse in Crepis.** (Further remarks on the chromosome relations in Crepis.) Svensk Bot. Tidskr. 14: 319–325. *5 fig.* 1920 (see Bot. Absts. 7, Entry 236).] Zeitschr. Bot. 13: 320–321. 1921.

768. TISCHLER, G. [German rev. of: WINKLER, HANS. **Verbreitung und Ursache der Parthenogenese im Pflanzen- und Tierreiche.** (Distribution and cause of parthenogenesis in the plant and animal kingdoms.) *8 vo, vi + 231 p.* Gustav Fischer: Jena, 1920.] Zeitschr. Bot. 13: 317–320. 1921.

769. TRELEASE, W. **The survival of the unlike.** Science 51: 599–605. 1920.—The species and groups of species of agaves of the different islands of the West Indies differ from one another somewhat in proportion to the depth of water between their habitats. In any 2 adjacent islands the species differ sometimes in one character and sometimes in another, though no climatic difference is evident. It is not obvious that these differences are, or were, of survival value.—*John Belling.*

770. TSCHERMAK, E. VON. **Beobachtungen bei Bastardierung zwischen Kulturhafer und Wildhafer.** [Observations on hybridization between cultivated oats and wild oats.] Zeitschr. Pflanzenzücht. 6: 207–209. 1918.—In hybrids between wild oats and cultivated oats it has been determined that there is absolute coupling between the wild-oat characters, (M_1) falling apart of the spikelets on ripening, that is, brittleness with breaking apart at the horseshoe-shaped callus, and (M_2) complete beardedness. On the other hand, there is complete incompatibility of the wild-oat character, (M_3) strong hairiness of the lemmas of all flowers, and (m_4) the cultivated-oat character, yellow glume color; and also (in the observations of the author) of the wild-oat character, (M_4) brown glume color, and (m_3) the cultivated-oat character, glabrousness. Schematically represented:-

$$\begin{aligned} F_1 &= M_1 < m_1;\ M_2 \lesseqgtr m_2;\ M_3 \lesseqgtr m_3;\ M_4 > m_4 \\ F_2 &= (1)\quad (M_1M_2)\ (M_3M_4) \\ &\ (2)\quad (M_1M_2)\ (m_3m_4) \\ &\ (3)\quad \text{as } F_1 \\ &\ (4)\quad (m_1m_2)\ (m_3m_4) \end{aligned}$$

The following combination is lacking:

$$(m_1m_2)\ (M_3M_4)$$

These combinations are barred out:

$$(M_1M_2)\ (m_3M_4),\ \text{and}\ (M_1M_2)\ (M_3m_4)$$

There is repulsion between groups (m_1m_2) and (M_3M_4), that is, a coupling of groups (M_3M_4) and (M_1M_2), but not vice versa. Limiting "wild-form" (wf) to the coupled character pair brittle-fully-bearded and "cultivated-form" (cf) to non-brittle-weakly-bearded, then the method of inheritance is as follows, agreeing with the barley-glume type:

P_1 cf × wf; F_1 intermediate (in general the non-brittleness of cf dominant)

F_2	wf 4 :	Intermediate I 9 :	cf 3
F_3	Constant	4 segregate, wf : I : cf = 4 : 9 : 3 2 segregate, I : wf = 3 : 1 2 segregate, I : cf = 3 : 1 1 constant	2 segregate, cf : wf = 3 : 1 1 constant

This is explained on a bi-factorial basis on presence and absence theory as "wild-form" (*ABAB*) and "cultivated-form" (*abab*), or on association-dissociation difference in relation to 3 mutually present factors, where "wild-form" is $A^\wedge B^\wedge C$ and "cultivated-form" is $A\downarrow B\downarrow C$.—*C. E. Leighty.*

771. Vogtherr, Karl. Über die theoretischen Grundlagen des Variabilitäts- und Deszendenzproblems. [On the theoretical fundamentals of the problems of variation and descent.] Zeitschr. Indukt. Abstamm.- u. Vererb. 19: 39–72. 1918.—In his introduction the author claims that whereas empirically great progress has been made with experiments in which species of animals have been modified into others by changing external conditions, the theory is still backward, and the strife between the Lamarckians and Darwinists is continued with the old blunted weapons. He is greatly impressed by Tower's classical experiments on the production of new species of potato beetles by experimental conditions and by Kammerer's work on *Alytes*, which he thinks prove the possibility of evolution in organisms. Both in inorganic objects and in organisms atypical and typical forms can be distinguished. Typically formed natural objects do not follow external influences but internal laws. There are no completely typical natural objects. The real task of the naturalist is to find the typical among what happens.—Variation can be caused by changes in external conditions or can be also combined with a change in the internal plant. The author calls these 2 kinds of variation homotypical and heterotypical.—The causes for all variations are changes in the environment. The lines according to which the phylogenetic development will proceed are potentially determined and unchangeable.—According to Vogtherr it is illogical to demand that the changed character shall continue after the conditions which caused them have changed back to the original ones. Putting the organisms back into normal conditions is a second experiment on heredity, and a change of the characters back to normal constitutes a second, additional proof, not a refutation. There is no reason to expect that heterotypical variation will be irreversible. The author introduces a "vital force" (Lebenskraft). This vital force reacts upon external conditions. That part of the paper in which the author defines his standpoint as not being quite that of either Driesch, Kant, or Schopenhauer should be read in the original.—The cause of physical things can never be psychical. It is fundamentally impossible to find a scientific explanation of the harmony which we observe in organisms, because the organizing principles are the forces of the organic nature. This harmony is not historically developed, but it has always existed and will exist eternally.—*A. L. Hagedoorn.*

772. Waardenburg, P. J. [Dutch rev. of: Behr. **Die Heredodegeneration der Makula. (Heredodegeneration of the macula.)** Klin. Monatsbl. Augenheilk. 65: 465. 1920.] Genetica 3: 88–91. 1921.

773. Waardenburg, P. J. [Dutch rev. of: Briggs, H. H. **Hereditary congenital ptosis with report of 64 cases conforming to the Mendelian rule of dominance.** Amer. Jour. Ophthalmol. 1919: 408. 1919.] Genetica 3: 65–66. 1921.

774. Waardenburg, P. J. [Dutch rev. of: Fleischer, Bruno. **Über myotonische Dystrophie mit Katarakt. (Myotonic dystrophia and cataract.)** Arch. Ophthalmol. 96: 91–133. 1918.] Genetica 3: 91–96. 1921.

775. Waardenburg, P. J. [Dutch rev. of: Traquair, H. M. **Hereditary glioma of the retina.** British Jour. Ophthalmol. Jan., 1919.] Genetica 3: 81. 1921.

776. WESTERBEEK VAN EERTEN, J. B. [Dutch rev. of: WESTERBEEK VAN EERTEN, J. B. arts te Hummelo. **Engenetiek, historischcritisch over-zicht. (Engenics, a historical critical review.)** *207 p.* A. A. von Deutekom: Utrecht, 1920.] Genetica 3: 81–88. 1921.

777. WETTSTEIN, F. VON. **Künstliche haploide Parthenogenese bei Vaucheria und die geschlechtliche Tendenz ihrer Keimzellen. [Artificial haploid parthenogenesis in Vaucheria and the sexual tendency of its germ cells.]** Ber. Deutsch. Bot. Ges. 38: 260–266. *Fig. 1-2.* 1920.—Antheridia were removed at a very early stage of development; later, when the oogonium had reached its full size and was cut off by a partition wall, but before opening, it was pricked with a fine needle or with a thin, sharp glass capillary tube. To prevent the oozing out of the cell contents, each operation was performed in a plasmolyzing solution (3 per cent KNO_3); after about 2 minutes the plant was returned to the normal nutrient solution. Of numerous oogonia of *Vaucheria hamata* (Vauch.) DC. thus treated, 3 grew out into filaments; 1 of these filaments died while still short; the other 2 were separated from the parent plant, and each developed into a plant of typical form which, like the mother plant, bore both antheridia and oogonia.—Of a considerable number of antheridia similarly wounded, 2 developed into filaments, 1 of which survived to become likewise a typical monoecious plant.—Of *V. sessilis* (Vauch.) DC., 1 oogonium was induced to regenerate, with similar results.—These experiments are considered as supporting the notion of CORRENS that both sexual potentialities are present in the cells of both monoecious and dioecious plants, whether haploid or diploid, and that the development of either sex organ results from the action of factors which inhibit the expression of the opposite potentiality, either in the plant as a whole (dioecism) or in a particular part of the plant (monoecism). In the present case, the regenerating organs contained only the sexual nuclei, which in each case, therefore, must carry both sexual potentialities.—*C. E. Allen.*

778. WITSCHI. [German rev. of: LEBEDINSKY, N. G. **Darwins geschlechtliche Zuchtwahl und ihre arterhaltende Bedeutung. (Darwin's sexual selection and its significance for the maintenance of species.)** Habilitationsvortrag Univ. Basel. *31 p.* Helbing Lichtenhahn: Basel, 1918. IDEM. **Geschlechtsdimorphismus und Sexualselektion. (Sex dimorphism and sexual selection.)** Verh. Naturf. Ges. Basel 30: 1919.] Biol. Zentralbl. 40: 571–573. 1920.

HORTICULTURE

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FRUITS AND GENERAL HORTICULTURE

779. ANONYMOUS. **Culturas intercalares entre os coqueiros. [Crops for interplanting between coconuts.]** Bol. Agric. [Nova Goa, Portuguese East India] 1: 210-212. 1919.—Minor crops are listed which can be cultivated between the rows in coconut plantations, including those that may be grown during the first 5 years before the coconuts are in bearing and those that may be grown after that time. Sweet potatoes, coffee, millet, bananas, cassava, tomatoes, peppers, eggplants, and other vegetables are recommended. Various leguminous cover crops will also prove beneficial.—*John A. Stevenson.*

780. ANONYMOUS. **Posição do côco-semente no solo. [Position of the seed coconut in the ground.]** Bol. Agric. [Nova Goa, Portuguese East India] 1: 212–214. 1919.—An experiment was carried out to ascertain the proper position for planting coconuts. One lot was placed vertically with the germ end up, a 2nd lot in the reverse position, a 3rd lot horizontal with the germ end slightly depressed, a 4th lot horizontal, and a 5th lot the reverse of the 3rd. It was found that coconuts in the 3rd and 4th positions germinated best.—*John A. Stevenson.*

781. ANONYMOUS. **Sobre a floração da mangueiro.** [The blooming of the mango.] Bol. Agric. [Nova Goa, Portuguese East India] 1: 207–210. 1919.—The causes of non-flowering in the mango (*Mangifera indica*) are discussed, including excessive heat and humidity, insects, and overproduction the previous year. Remedies for certain of these conditions are outlined. —*John A. Stevenson.*

782. ANONYMOUS. **Two new raspberries.** Jour. Pomol. 1: 243. *2 pl.* 1920.—Two promising new varieties of red raspberry are described, the Pyne's Royal and the Park Lane, both originated by Mr. Pyne of Topsham, Devon, and introduced in 1912 and 1913.—*L. H. MacDaniels.*

783. ALLEN, W. J. **Fruit trees that have been blown over.** Agric. Gaz. New South Wales 32: 292. 1921.—The article discusses the handling of such trees.—*L. R. Waldron.*

784. ANTHONY, R. D. **Has the orchard survey a place on the research program?** Proc. Amer. Soc. Hort. Sci. 17: 174–178. 1920 [1921].—This paper discusses the manner in which a pomological survey, dealing chiefly with apples, was conducted in Pennsylvania. The author concludes that, inasmuch as the survey brought the College and Station staff into close contact with actual field conditions in the state, the staff was thereby in a much better position to plan and conduct its research work so as to be of the greatest value to the state. This would not have been possible without the intimate knowledge of the problems which were brought out by the survey.—*H. W. Richey.*

785. AUCHTER, E. C. **A preliminary report on apple and pear breeding in Maryland.** Proc. Amer. Soc. Hort. Sci. 17: 19–32. 1920 [1921].—This is a preliminary report covering the investigations in apple and pear breeding during the past 15 years. The pear crosses are mainly between Keiffer and other standard varieties. In most of the apple crosses one or both parents were from early varieties. Since many of the pear and apple seedlings have not fruited, a detailed study has been made only of the results secured from the 1907 early-apple crosses. The varieties intercrossed have been chiefly Early Ripe, Yellow Transparent, Williams, Red June, Astrachan, and Early Harvest. Seeds have also been secured from these varieties when open pollinated. The results show that certain crosses set fruit better than others; that more seeds per apple were produced from some crosses; that the percentage of germination varied considerably, and that in certain crosses a greater percentage of seedlings died, whether from poor environmental conditions or weak constitutional vigor. There is a suggestion that the factor, or factors, for long length of apples is dominant over the factor, or factors, for shorter length, those for red color over those for yellow color, and those for acid or sub-acid flavor over those for mild sub-acid or sweet flavor. The fruit of seedlings has about the same ripening period as that of their parents. Of the 166 crossed seedlings, 24 appear to be promising, of the 90 seedlings produced from open pollinated fruit, only 2 are promising. Williams seems to be a good variety for early-apple breeding. Of the cross, Williams × Transparent, one seedling, ripening as early as the earliest Transparents, is very promising.—*E. C. Auchter.*

786. BALME, JUAN. **El kaki.** [The kaki] Rev. Agric. [Mexico] 5: 505–507. *3 fig.* 1920. —The possibilities of the culture of the kaki, or Japanese persimmon, in Mexico are discussed. Several varieties are described.—*John A. Stevenson.*

787. BALME, JUAN. **El porvenir de las frutas tropicales. El coco y el dàtil.** [The future of tropical fruits. The coconut and the date.] Rev. Agric. [Mexico] 5: 579–581. *3 fig.* 1920.— The possibilities of growing the date and coconut commercially in Mexico are discussed.— *John A. Stevenson.*

788. BALME, JUAN. **La viticulture en Mexico.** [Viticulture in Mexico.] Rev. Agric. [Mexico] 5: 581–583. *2 fig.* 1920.—In order to encourage the grape growing industry in Mexico, the Department of Agriculture has decided to distribute a million plants of selected varieties. For comparative purposes, statistics of the California industry are given.—*John A. Stevenson.*

789. BARKER, B. T. P., AND G. T. SPINKS. **Fruit breeding investigations at Long Ashton.** Jour. Pomol. 1: 224–234. 1920.—A large number of crosses were made between different varieties of apples, pears, plums, cherries, currants, gooseberries, and strawberries. The purpose of the work was to produce varieties with definite combinations of characters by using known parents, and to ascertain to what extent the offspring would resemble the different parents. Most of the tree-fruit seedlings have not yet come into bearing, so no conclusions can be drawn. —Seedlings from the seeds of the same apple in a given cross resemble each other in fruit characters more closely than those from different fruits of the same cross.—The results of raspberry breeding are unsatisfactory because nearly all the hybrids produce very few blossoms.—*L. H. MacDaniels.*

790. BARNETT, R. J. **Terminology of orchard soil management methods.** Proc. Amer. Soc. Hort. Sci. 17: 172–174. 1920 [1921].—The stated purpose of the article is the discussion of definitely fixing the terminology and orthography of pomological literature. For illustration, a list of terms descriptive of various orchard soil management methods with their orthography and definitions is submitted.—*H. W. Richey.*

791. BARSS, H. P. **Success in spraying.** Better Fruit 15^{8}: 3–4. 1921.—Though spraying has reached its highest development in the Pacific Northwest, there are certain pertinent facts that the grower must keep in mind in order to be successful: (1) Spraying is not a cure but a prevention; (2) timeliness of application is essential; (3) the work must be thorough (iron sulphate [copperas] may be used as an indicator); (4) a particular spray must be used for a particular disease or pest; (5) spraying is cumulative in effect; (6) economy of spraying is measured not by the amount of spray saved but by the degree of prevention secured.—*A. E. Murneek.*

792. BEACH, S. A. **Fruit breeding in the Northwest and its significance in horticultural development.** Proc. Amer. Soc. Hort. Sci. 17: 13–19. 1920 [1921].—The author discusses fruit breeding in the upper Mississippi Valley and Great Plains regions where most of the standard fruits have failed because of inability to withstand the climatic extremes. In the more favored areas, a few standard varieties of apples and some cherries are grown, but practically no standard varieties of plums, sweet cherries, peaches, quinces, pears, and other orchard fruits.—The obstacles to success in fruit breeding are many, one of the most important being the lack of hardiness of the most desirable types. Barring the crab apple, the Hibernal and others of its type appear to be superior in hardiness. One problem is to determine to what extent hardiness in the apple and crab apple can be segregated and recombined with other desirable characters, and what varieties can best be depended upon as parents to transmit these characters. Late-keeping winter apples must be developed for the region. There are several good summer and early autumn varieties which are either crab hybrids or of the Russian group. It is thought that in time many hardy varieties will be developed for this region, and that there is a great future for both amateur and commercial fruit growing in the section.—*E. C. Auchter.*

793. BEEKHUIS, H. A. **Handling the peach crop.** Associated Grower 1^{5}: 7, 42. 1920.—Well matured, uninjured, and properly treated peaches yield the best dried product.—*E. L. Overholser.*

794. BONCQUET, P. A. **The dieback of Emperor grapes.** Associated Grower 1^{7}: 9, 42, 43, 48. 1920.—Occasionally vines remain dormant, not growing in the spring. If they do develop, their growth remains incomplete and the leaves undersized. This behavior is attributed to lack of carbohydrate supply.—*E. L. Overholser.*

795. BONNET, L. O. **The Dizmar grape.** Associated Grower 1^{8}: 24–25, 42. 1920.—The berry is large, almost ellipsoidal in shape, has neutral flavor, thin skin, and crisp texture. The bunch is large, ovoid elongated, and loose, and the vine is vigorous with long spreading canes. It is a good shipping grape, grows well on soils adapted to the Muscat, and will bear profitable crops if pruned long.—*E. L. Overholser.*

796. BRADY, J. **Protecting orchards from frost with smudge-pots.** Agric. Gaz. New South Wales 32: 256. 1921.—The article briefly describes the method used in California.—*L. R. Waldron.*

797. BROWN, G. G. **Fertilizer for orchard and bush fruits.** Better Fruit 15[9]: 8, 23–25. 1921.—The writer recommends the following fertilizing program based on observations and experiments performed at the Hood River Branch Experiment Station: No fertilizer should be used for young trees if the ground is clean cultivated and new growth is ample; otherwise ½–1 lb. of nitrate of soda per tree. When trees are commencing to bear, but show poor vegetative growth, 2 pounds of nitrate per tree may be advisable. In old orchards nitrate of soda may be of great value, excepting where alfalfa or clover is grown and plowed in; the latter will furnish enough nitrogen to supply the needs of the tree. When alfalfa has "run out," clean cultivation may be practiced for 1 or 2 years followed by new seeding of alfalfa. A small amount of nitrate of soda may be added to advantage during the 1st year after seeding to alfalfa or clover.—For strawberries the writer recommends a complete fertilizer made up as follows: Nitrate of soda 800 lbs., superphosphate 800 lbs., beet char 400 lbs.—*A. E. Murneek.*

798. BROWN, W. S. **The December freeze—some lessons from it.** Oregon Agric. Exp. Sta. Crop Pest and Hort. Rept. 3: 9–14. *Fig. 1–4.* 1921.—This article consists of notes indicating the relative behavior and resistance of varieties of fruit trees to winter freezes, some methods of treatment of winter-injured trees, and cultural advice on possible means of preventing such injury.—*E. J. Kraus.*

799. BUNYARD, EDWARD A. **The history of paradise stocks.** Jour. Pomol. 1: 166–176. 1920.—This is an endeavor to straighten out the confused botanical relationships of the different types of paradise stocks. The history of the various types is traced from the time of Theophrastus.—*L. H. MacDaniels.*

800. CHOMLEY, F. G., AND J. ARTHUR. **Some experiences with fruit under irrigation.** Agric. Gaz. New South Wales 32: 273–276. 1921.—Methods of irrigation and culture are given; also notes on varieties, and spraying to combat disease.—*L. R. Waldron.*

801. COIT, J. E. **Mechanical theory of splitting figs.** Associated Grower 1[8]: 30–31. 1920.—Transpiration is suddenly stopped by a drop in temperature and the roots continue to supply water to the figs, bursting them. If this hypothesis is correct the best general prevention would be the application of uniform moisture. Fermentation is caused by infection with yeasts. If the fig is well sugared, yeast will do no harm. Fermentation by yeasts invites other destructive fungi, such as blue molds, black smut, and dry rot.—*E. L. Overholser.*

802. CONDIT, I. J. **California fig soil and fertilizers.** Associated Grower 1[1]: 18–19. 1920.—Although very resistant to alkali, it is inadvisable to plant figs on soil containing more than 0.03 per cent total salt. A high water table acts detrimentally on the fig crop, reduces leaf surface, and retards the normal activities of the tree.—*E. L. Overholser.*

803. CONDIT, I. J. **Getting the people acquainted with the great American fig.** Associated Grower 1[8]: 18, 35. 1920.—The Kadota fig tree is resistant to unfavorable moisture conditions, and a rank grower when given an abundant water supply. The 1st crop consists of much larger sized fruit than the 2nd, the latter, however, being much better for preserving and canning purposes. Caprification affects the fruit of the Kadota more noticeably than it does most other common figs. The value of caprification depends upon ultimate use to which the fruit is to be put; thus, caprified figs though better for drying are not so desirable for canning. Being very adaptable to soil and climate conditions, the Kadota is propagated over a wide range of territory.—*E. L. Overholser.*

804. CONDIT, I. J. **Points on practical culture of figs.** Associated Grower 1[2]: 9, 46. 1920.—Caprification is now recognized as a necessity in the production of Smyrna figs. Three capri fig trees must be planted for every 100 Calimyrna trees. The female Blastophaga can

enter when the figs are less than ¾ inch in diameter; the flowers of such figs are presumably receptive to pollen. From that stage until the figs reach about 1 inch in diameter they may be entered by insects and caprified. Capri figs are ready to pick as soon as the male insects issue freely from the gall flowers. The most popular varieties of caprifigs are Stanford and Roeding No. 3.—*E. L. Overholser.*

805. CONDIT, I. J. **Summer pruning of the fig.** Associated Grower 1^4: 28–30. 1920.—Certain varieties, like the Mission and Adriatic, respond profitably to early summer pruning. Summer pruning not only favors a desirable crop but also accentuates the growth of the main framework of the tree; thus the amount of succulent growth is greatly reduced and better protection is afforded against winter frosts.—*E. L. Overholser.*

806. CRADWICK, W. **Cocoa.** Jour. Jamaica Agric. Soc. 25: 52–57. 1921.—The author presents a discussion of cacao growing under Jamaican conditions, including cultural directions, shading, pruning, and the proper time for picking.—*John A. Stevenson.*

807. CRANDALL, C. S. **An experience in self-fertilization of the peach.** Proc. Amer. Soc. Hort. Sci. 17: 33–37. 1920 [1921].—Investigations were made concerning the self-fertility of seedling peach trees of known parentage, some of which were grown in the orchard and others in the greenhouse under more or less controlled conditions. Some buds were emasculated and hand pollinated while others were covered without emasculation or hand pollination. By the former method, as practiced in the orchard, 6.38 flowers were required to produce one seedling tree; by the latter, 20.5 to produce one seedling tree growing in the orchard. This reduced number was due to lack of fertilization, undeveloped embryos, and poor germination of seed. The work done under glass was less successful from the standpoint of surviving seedlings since each required the pollination of 7.24 flowers. It is probable that this difference is due to deficient nutrition of the trees grown in tubs.—*E. C. Auchter.*

808. CRANE, M. B. **The raising of fruit trees from seed.** Jour. Pomol. 1: 210–216. *2 fig.* 1920.—An account is presented of the methods used in raising fruit-tree seedlings at the John Innes Horticultural Institution, Merton, England. Seeds of stone fruits are removed from fruits and stratified at once in sterilized sand or soil. They are kept all winter in a moist condition in cold frames with full exposure to frost. Early the following year the seeds are removed from the shells and planted in boxes in a cool greenhouse.—Apple seeds are removed from the fruits in the fall and sown directly in the germination flats in cold frames. When germination starts, the flats are taken into the cool greenhouse.—Plum and apple seeds kept dry till late in the winter will not germinate until the following year. Seedlings usually fruited the 6th year from seed. Buds from 2-year old seedlings budded on other stock flowered in 6 years from bud (8 years in all).—*L. H. MacDaniels.*

809. CRUESS, W. V. **Rain damage insurance.** Associated Grower 1^7: 3, 19, 36. 1920.—For obtaining a high yield of superior evaporated grapes the writer emphasizes the importance of using well ripened fruit. The installation and use of evaporators is considered an economy. [For details see Bot. Absts. 6, Entry 1176.]—*E. L. Overholser.*

810. DURHAM, HERBERT E. **The recognition of fruit. II. Some systems concerning apples and pears.** Jour. Pomol. 1: 177–187. 1920.—To date no very satisfactory classification of varieties of apples and pears has been made by which the varietal name of an unknown specimen can be determined. It is in fact doubtful if any such classification can be made on account of the great variation within a variety. A number of such classifications have been proposed; several of these are outlined briefly while that of TRUELLE is given at length.—*L. H. MacDaniels.*

811. FAIRCHILD, DAVID. **La papaya injertada como arbol frutal anual. [The grafted papaya as an annual fruit tree.]** Rev. Agric. [Mexico] 5: 433–437. *3 fig.* 1920.—The possibilities of the grafted papaya (*Carica papaya*) as an annual fruit crop are discussed. Directions for making the grafts and general cultural directions are given.—*John A. Stevenson.*

812. FANTINI, N. **Varios sistemas de poda.** [Pruning systems.] Defensa Agric. [Uruguay] 2: 11-16. *13 fig.* 1921.—Popular.—*John A. Stevenson.*

813. HARTMAN, H. **Depth of planting in relation to tree growth.** Oregon Agric. Exp. Sta. Crop Pest and Hort. Rept. 3: 47-48. *11 fig.* 1921.—Young trees of Esopus and Gravenstein apples, d'Anjou pears, and Italian prunes were set at varying depths, ranging from that at which the tree grew in the nursery to 27 inches below that depth. After 4 years there were no striking differences in size and vigor of tops or diameter of trunks. In all cases of deep planting the tendency of growth of the original roots was toward the surface of the soil. The pear trees developed no roots above the graft, the apple trees developed a few though they were of no real importance, whereas the prune trees developed many, but they did not correspond in amount to the development of the tops of the trees.—*E. J. Kraus.*

814. HARVEY, E. M. **Summer pruning of young apple trees.** Oregon Agric. Exp. Sta. Crop Pest and Hort. Rept. 3: 20-26. *Pl. 1-2.* 1921.—From experiments designed to test the effect of various combinations of winter and summer pruning and involving 1100 young Rome and Gano apple trees, it appeared that all types of summer pruning allowed less tree growth than winter pruning only; fruit-spur formation was not increased, and the amount of fruit harvested in the case of summer-pruned trees was less than that from those winter-pruned only. Summer-pruning practices must be regulated in accordance with varietal behavior.—*E. J. Kraus.*

815. HARVEY, E. M., AND A. E. MURNEEK. **Some relations of growth and bearing of fruit trees to orchard practices.** Oregon Agric. Exp. Sta. Crop Pest and Hort. Rept. 3: 15-19. *Fig. 5.* 1921.—Undefoliated spurs of apple trees were able to form abundant fruit buds and to set a good crop of fruit, while the reverse was true for defoliated spurs. The latter contained relatively more nitrogen and less carbohydrate than the undefoliated spurs. Certain effects of some orchard practices are analyzed on the basis of how they may affect the carbohydrate-nitrogen relationships in the trees.—*E. J. Kraus.*

816. HEDRICK, U. P. **Pedigreed nursery stock.** Jour. Pomol. 1: 155-160. 1920.—Experience at the New York State Experiment Station and extensive reference to the horticultural literature lead to the conclusion that varieties of fruits have not been, and cannot be, improved by bud selection. It is nurture, not nature, that produces the variation in varieties. The present practices in the propagation of fruit trees are justified by the precedents of centuries. The practical difficulties in growing trees from selected buds are almost insuperable, and the burden of proof is upon those who advocate growing pedigreed trees. The author is dealing entirely with deciduous fruits.—*L. H. MacDaniels.*

817. HODSOLL, H. E. P. **Manuring fruit trees for continuous crop production.** Jour. Pomol. 1: 217-223. 1920.—After 4 years' experience with different varieties of apples and other fruit, the writer concludes that it is entirely practicable to produce heavy crops each year by proper use of manures. A "special soluble organic manure" applied in August assures abundant flower-bud formation. This is followed in the winter by a dressing of "lasting organic manure" such as hoof meal, meat and bone meal, or similar materials. This insures sufficient vigor in the tree to support the blossoms and hold the crop. Fruitfulness results when the proportion of elaborated food to mineral nutrients is high. The reverse condition causes vegetative growth only. No data are given.—*L. H. MacDaniels.*

818. HOPPERT, E. H. **Extension work in fruit growing in Nebraska.** Proc. Amer. Soc. Hort. Sci. 17: 91-94. 1920 [1921].—The article deals with the extension work in home apple orcharding in Nebraska. The chief problems considered are proper care of bearing orchards and the correct planting and caring for new home orchards. In the extension work, pruning and spraying demonstrations are given, demonstration orchards are selected, meetings are held, timely articles are written, and exhibits are held at the various county fairs.—*H. W. Richey.*

819. Howard, F. K. **Training young vines.** Associated Grower 1^2: 10. 1920.—The single trunk system of training and forming a comparatively high head gives the best results over a long period of years. Permanent stakes are placed at planting time, and, when sufficient growth develops, the strongest and best shoot is tied to the stake. All others are removed except one,—to be used in case of damage to the main branch.—*E. L. Overholser.*

820. Kelley, W. P. **Present status of alkali.** Associated Grower 1^3: 11–12, 38. 1920.—Citrus trees and walnuts are especially sensitive to soil salinity. Water rich in salts and a high irrigation water table are the chief factors causing soil alkalinity. The spread of alkali by the latter method may be avoided by (1) lining or cementing the canals at the outset, and (2) by using better methods of distributing the water, especially by applying less water at a time. Drainage, especially if it be accompanied by flooding, is a reasonably successful means of removing white alkali from soil. Leaching the excess of salts out of the soil and at the same time maintaining chemical and physical conditions favorable to crop growth remains a problem.—*E. L. Overholser.*

821. Melander, A. L. **The relation of beekeeping to fruit growing.** Amer. Bee Jour. 61: 138–139. 1921.—A popular discussion of the advantages of the cross-pollination of fruit trees. For this purpose no insect is so valuable as the honeybee. Many orchardmen pay $5 per colony for the use of bees during the blooming period of fruit trees.—*J. H. Lovell.*

822. Murneek, A. E. **"Pedigreed" trees—where do we stand?** Better Fruit 15^8: 13–15. 15^9: 6–8. 1921.—Since bud selection for propagating purposes has become of great economic importance with citrus fruits in California, the writer raises the question of its value and practicability with deciduous trees in the Pacific Northwest. Reviewing the work of several experiment stations where bud selection experiments have given negative results, the author concludes that selected or "pedigreed" stocks of deciduous trees are no better than ordinary trees—at least in the light of our present knowledge.—*A. E. Murneek.*

823. Murneek, A. E. **Stock influence on scion—in regard to top grafting.** Better Fruit 15^7: 3–4, 34–36. 1921.—There are many ways in which the scion may be modified by the stock. The following have been considered in detail: (1) Form and size of the plant, (2) vigor of growth, (3) health, (4) hardiness, (5) productivity and precocity, (6) time of blossoming and maturing of fruit, and (7) longevity. The indirect influence of the stock on the scion, as expressed in changes of character of the fruit, may be as follows: (1) Modification of color, (2) change in size, and (3) changes in eating and keeping quality.—*A. E. Murneek.*

824. Murneek, A. E. **The storage of Bosc pears.** Oregon Agric. Exp. Sta. Crop Pest and Hort. Rept. 3: 27–32. *Fig. 6–7.* 1921.—Time of picking does not materially influence storage quality, except that fruit picked very early must be partially ripened under more humid conditions and for a longer period than fruit picked later. Fruit may be kept for 3 months or longer by the following storage procedure: Delay 10 to 15 days, car temperature 12 to 15 days, then cold storage. Delayed fruit should be held at 60–70 per cent humidity. Both relatively high temperature with low humidity and low temperature with high humidity are harmful to proper ripening.—*E. J. Kraus.*

825. Nichols, H. E. **New interest in Iowa home orchards.** Proc. Amer. Soc. Hort. Sci. 17: 87–91. 1920 [1921].—The article discusses the manner in which spraying demonstrations for the home orchard have developed during the past 10 years. It explains the organization and states the success of spray rings under the direction of the County Agent and the Extension Horticulturist with the cooperation of the Iowa Fruit Growers' Association. Figures are given showing the growth of the movement, the average cost of spraying, and the returns.—*H. W. Richey.*

826. Overholser, E. L. **Fruit exhibits and fruit judging.** Associated Grower 1^3: 28–30. 1920.—Emphasis is laid on condition, uniformity, color, size, and form,—the 5 main

factors in determining the standard of exhibition fruit. Other necessary details to be borne in mind by the farmer in selecting and exhibiting products, so as to obtain the most satisfactory results, are outlined.—*F. deVilliers.*

827. OVERHOLSER, E. L. **The nectarine belongs to the peach family.** Associated Grower 1^{10}: 27, 35. 1920.

828. ROBERTS, R. H. **Studies in biennial fruiting.** Jour. Pomol. 1: 197–202. 1920.—Extracts reprinted verbatim from Proc. Amer. Pomol. Soc. 1917: 28–33. 1918 (see Bot. Absts. 7, Entry 999).—*L. H. MacDaniels.*

829. SCHMIDT, R. **Care of old grafted trees and vines.** Associated Grower 1^4: 7, 44. 1920.

830. SCHMIDT, R. **How to wire limbs bent by fruit.** Associated Grower 1^7: 7. 1920.

831. SCHMIDT, R. **Summer pruning in raisin vineyards.** Associated Grower 1^2: 10. 1920.—As the plant requires an abundance of leaf surface to make a satisfactory growth, summer pruning should be mild. However, some pruning during the growing season is beneficial especially in 1- and 2-year old plants.—*E. L. Overholser.*

832. SCHUSTER, C. E. **Cherry breeding.** Oregon Agric. Exp. Sta. Crop Pest and Hort. Rept. 3: 42–43. 1921.—Seedlings of the Bing, Lambert, and Napoleon varieties have proved self sterile but set good crops when open to insect pollination. Resistance to gummosis is variable. A large number produce fruit of excellent quality. The season of maturity is variable, as is also the texture of the flesh; some are suitable for fresh shipment, others for canning.—*E. J. Kraus.*

833. SCHUSTER, C. E. **Pollination of the Ettersburg No. 121 strawberry.** Oregon Agric. Exp. Sta. Crop Pest and Hort. Rept. 3: 44–46. *Fig. 9–10.* 1921.—The fruit of this variety is very solid, borne on stiff upright stalks, and suitable for canning. All evidence indicates that it is self-fertile and cross pollination does not increase the yield. About 13 per cent of the secondary blossoms mature into fruits, whereas practically all of the primary blossoms mature. Since each plant produces a total of 150–600 blossoms, and of these from 50–54 per cent are considered as primary, normally as many fruits are set as can be matured to good size.—*E. J. Kraus.*

834. SMART, W. A. **Control of moss and lichens in the orchard.** Oregon Agric. Exp. Sta. Crop Pest and Hort. Rept. 3: 172–173. *Fig. 49.* 1921.—A late fall or winter spray of Bordeaux mixture, 6–6–50, or of lime-sulphur, 1–8, sufficient to saturate the growths will destroy moss and lichens.—*E. J. Kraus.*

835. SNYDER, E. **A year's work with Zante currants.** Associated Grower 1^7: 26–27. 1920.—Panariti is the main variety of "currants" grown. Ringing has been demonstrated to be a good, as well as a necessary, practice. For drying, the fruit should be fully mature.—*E. L. Overholser.*

836. SNYDER, E. **Grafting over old vines.** Associated Grower 1^1: 5, 43. 1920.

837. SNYDER, E. **Timely hints on ringing the Panariti.** Associated Grower 1^2: 6. 1920.—Ringing is best practiced during the blooming period. Preferably each cane should be ringed separately, making 2 cuts $\frac{1}{8}$–$\frac{1}{4}$ inch apart as close to the base of the cane as possible, and completely removing the bark between the incisions. The resulting clusters are heavier, more compact, and more uniform.—*E. L. Overholser.*

838. TAYLOR, R. H. **Next year's peach crop depends on care of trees.** Associated Grower 1^8: 5–6. 1920.

839. Thomas, Owen. **Forgotten or discarded grapes.** Jour. Pomol. 1: 161–165. 1920.—The author discusses the quality and characters of a number of varieties of grapes, especially those grown in England about 1860.—*L. H. MacDaniels.*

840. Wellington, Richard. **Grape varieties that produce seedlings of superior merit.** Proc. Amer. Soc. Hort. Sci. 17: 37–40. 1920 [1921].—The report deals with about 11,000 grape seedlings grown at the New York Agricultural Experiment Station, and obtained from 37 variety crosses, 38 varieties by seedling crosses, 9 seedling crosses, 163 variety self-fertilizations, 50 seedling self-fertilizations, and a few species crosses. The number of plants in each cross or self-fertilization varied from 1 to over 500.—The author concludes that only 1 individual out of each 1000 will be worthy of perpetuating. The crosses gave proportionately more desirable seedlings than the selfed varieties. Most of the varieties used proved to be poor parents but a few produced a remarkably large number of excellent seedlings. A table is included of the variety crosses and selfed varieties, showing the percentage and number of vines set and number and per cent selected for propagation. The most desirable crosses are Governor Ross × Mills, Mills × (Winchess × Diamond), Triumph × Mills, and Winchell × Diamond. Mills has been the leading grape for producing high quality. Diamond produced good quality and Winchell proved of exceptional value in introducing earliness without impairing quality. The author concludes that to produce desirable seedling grapes, *Vitis vinifera* species or derivatives of this species must be depended on for quality and *V. labrusca*, *V. vulpina*, and other American species for hardiness. More certain results will be obtained by crossing rather than selfing and in using varieties that are known to produce superior progeny.—*H. W. Richey.*

841. Whitten, J. C. **Thinning peaches makes better fruit.** Associated Grower 1[3]: 4. 1920.

842. Wilcox, L. P. **Fertilizer experiments with fruits.** Oregon Agric. Exp. Sta. Crop Pest and Hort. Rept. 3: 49–51. 1921.—Applications of 3½–5 lbs. of nitrate of soda to the soil under each of a number of old Italian prune trees 1 month before blooming resulted in increased growth and increased number and size of fruits. The time required to dry the fruit was not increased. Applications of the same material at the rate of 250 lbs. per acre to red raspberries at the time the new canes were about 3 inches tall resulted in more and larger canes per plant, and an increased yield of fruits of larger size and better color. There was severe killing of the new canes, which continued to grow into the fall and winter.—*E. J. Kraus.*

FLORICULTURE AND ORNAMENTAL HORTICULTURE

843. Aust, F. A. **A state program for landscape extension.** Proc. Amer. Soc. Hort. Sci. 17: 54–60. 1920 [1921].—The relation of landscape extension to the sciences is briefly touched upon. Man's need for natural beauty, and the usefulness and beauty of his natural surroundings are discussed. Landscape extension is defined as "The development of the appreciation and the furthering of the practice of the fundamental principles of the art of landscape design, by the citizens of every community." The designer must study the life about him in order to interpret it to the community which he serves. His duty is to teach the public the best in landscape art and to demonstrate the value of professional assistance. "The main function of landscape extension is education." The leaders must cooperate with existing organizations and agencies in order to avoid duplication of effort. The extension program should include: (1) Research in landscape problems, (2) demonstration, (3) lecture work, (4) publication, (5) follow-up work. Types of demonstrational work found effective in Wisconsin are listed and the paper closes with a discussion of the state extension program.—*W. R. Ballard.*

844. Balme, Juan. **Lirio del valle o muguet.** [Lily of the valley.] Rev. Agric. [Mexico] 5: 430–432. *4 fig.* 1920.—A popular account of the methods used in growing the lily of the valley in the U. S. A. and Europe.—*John A. Stevenson.*

845. DOMINGUEZ, IGNACIO. **El cultivo de las plantas florales ornamentales. [Cultivation of ornamentals.]** Rev. Agric. [Mexico] 4: 434–437. 1919.

846. MCCALL, F. E. **Farmstead planting.** Proc. Amer. Soc. Hort. Sci. 17: 64–69. 1920 [1921].—The author asserts that the field service of the agricultural colleges can as well be directed toward making country life more beautiful and enjoyable as toward making farming more profitable. Pleasant home surroundings have real value in the development of contented patriotic citizens.—The prairie sections require treatment adapted to the unusual conditions. In South Dakota the aim of the extension workers has been to combine beauty with utility and convenience. The Northern Great Plains have limitations in plant growth which must be recognized. In the planting of trees and shrubs 3 points should be observed as follows: (1) Thorough preparation of the soil, (2) the proper choice of plant materials, and (3) cultivation until plants are well established. General garden literature does not furnish reliable information for the prairie worker. Farmstead planning as practiced in South Dakota includes all those features which contribute to outward convenience and ornamentation. Suggestions under the heads of (1) the farmstead in general, (2) the house, and (3) out-buildings and lots, are given as to special features which should be considered in farmstead planning.—Suggestions are also given for the planting and care of trees and shrubs and a list of ornamentals for South Dakota conditions is appended.—*W. R. Ballard.*

847. WAUGH, F. A. **Extension work in landscape gardening.** Proc. Amer. Soc. Hort. Sci. 17: 60–64. 1920 [1921].—The distinction is made between the practical art of growing plants and the art of landscape design. The extension worker in landscape gardening should have in mind as his objectives: (1) The inculcation of a love and reverence for the native landscape, (2) the securing of public reservations of various forms, (3) the extension of the knowledge of landscape gardening, (4) the promotion of the development of better farm-home surroundings, (5) the promotion of similar development in towns and cities, (6) the promotion of the development of community equipment, the last being considered the most important field. The farm home furnishes the best point of first attack. The rural school grounds, country playgrounds, country roads, country parks and picnic grounds, state parks and similar large projects, grounds of public institutions and public cemeteries are all legitimate fields of operation. Four principal methods of work are suggested, as follows: (1) Practical or inspirational lectures, (2) publications, (3) organization of clubs and competitions, and (4) professional assistance. The 4th method is the most effective but should be accompanied by the other 3.—*W. R. Ballard.*

848. WILSON, E. H. **The "Indian Azaleas" at Magnolia Gardens.** Jour. Arnold Arboretum 2: 159–160. 1921.—Mention is made of the most interesting and important species and forms of the collection of Indian Azaleas at Magnolia Gardens, established about 1850 near Charleston, South Carolina.—*Alfred Rehder.*

849. YEAGER, A. F. **Shelterbelts for North Dakota.** North Dakota Agric. Exp. Sta. Ext. Div. Circ. 43. *7 p., 8 fig.* 1921.—The circular contains a list of the best varieties of trees and shrubs and gives methods of planting and care.—*L. R. Waldron.*

VEGETABLE CULTURE

850. BALME, JUAN. **La alcachofa. [The artichoke.]** Rev. Agric. [Mexico] 4: 517. 1919.—The author gives brief cultural directions for the globe artichoke (*Cynara scolymus*).—*John A. Stevenson.*

851. BOUQUET, A. G. B. **Factors affecting production and marketing of broccoli.** Oregon Agric. Exp. Sta. Crop Pest and Hort. Rept. 3: 36–39. *Fig. 8.* 1921.—There is a marked variation in strains, some including cabbage and kale crosses. Greater care in seed production is urged.—*E. J. Kraus.*

852. BOUQUET, A. G. B. **Factors affecting shrinkage and condition of broccoli.** Oregon Agric. Exp. Sta. Crop Pest and Hort. Rept. 3: 40–41. 1921.—The shrinkage of heads is very much greater if the latter are cut at any time after prime condition. It is preferable even to cut the heads immature rather than when they show signs of curd separation.—*E. J. Kraus.*

853. BOUQUET, A. G. B. **Vegetable greenhouse crops in relation to the use of the greenhouse for one season.** Oregon Agric. Exp. Sta. Crop Pest and Hort. Rept. 3: 33–35. 1921.—The author gives suggestions on crops which can be produced in the autumn.—*E. J. Kraus.*

854. PITT, J. M. **Farmers' experiment plots. Onion trials on the Manning river. 1920–21.** Agric. Gaz. New South Wales 32: 261–264. *2 fig.* 1921.—The total onion acreage for New South Wales for 1919 was only 335. Yields ran from 2.5 to 4.5 tons per acre. The crop is marketed from November to May and the price secured approximates $300 per acre. Seedlings were transplanted into the field in July (winter) and the harvest ran from November to January. Most varieties responded very favorably to irrigation. The maximum yield was secured from White Early Barletta, which gave 7.6 tons per acre.—*L. R. Waldron.*

HORTICULTURE-PRODUCTS

855. CHRISTIE, A. W. **Dried, evaporated or dehydrated?** Associated Grower 1^{3}: 20, 21. 1920.—The term "dried" is applied to all fruits and vegetables preserved by the removal of moisture, irrespective of the method of removal. To the class dried by artificial heat, the names "evaporated" and " dehydrated" are applied, as distinct from "sun-dried."—*E. L. Overholser.*

856. CRUESS, W. V., AND A. W. CHRISTIE. **Revised specifications of University Farm evaporator.** Associated Grower 1^{5}: 8, 40, 41. 1920.

857. GAJÓN, CARLOS. **Las rosas para perfumeria.-Su historia. [History of rose growing for perfume]** Rev. Agric. [Mexico] 5: 351–358. *13 fig.* 1919.—A popular account of the growing of roses for perfume as it is carried on in Spain, Bulgaria, Algeria, India, and France.—*John A. Stevenson.*

858. GIFFEN, W. M. **Analysis of federal findings in the raisin situation.** Associated Grower 1^{7}: 4–5, 46. 1920.

859. JURITZ, CHAS. F. **Apricot kernel oil and its congeners.** South African Jour. Indust. 3: 1052–1057. 1920.—Descriptions are given of the oils obtained from almond, apricot, and peach pits, with a table showing the composition of apricot-kernel oil as well as the following constants: Specific gravity, saponification value, acid value, refractive index at 40°C., and iodine value.—*A. J. Pieters.*

860. LEGRAND, J. F. **El achiote. [Annatto (Bixa orellana).]** Rev. Agric. [Mexico] 5: 441–442. *1 fig.* 1920.—Reprinted from Rev. Agric. Puerto Rico.—*John A. Stevenson.*

861. SCHMIDT, R. **Handling the peach crop.** Associated Grower 1^{6}: 7, 43. 1920.—Trees should not be shaken to obtain peaches for drying. Many of the peaches thus collected are relatively green, have a low sugar content, and yield a poor product; they also lose 10 per cent more in weight than an equal weight of mature peaches.—*E. L. Overholser.*

862. SCHMIDT, R. **Sugar content testing for raisins.** Associated Grower 1^{6}: 9, 44. 1920.—The author recommends the saccharometer as the most convenient instrument for sugar content determinations. The results are sufficiently accurate for ordinary practical purposes provided the necessary temperature corrections are made.—*E. L. Overholser.*

863. WIEGAND, E. H. **Some investigations on prune drying.** Oregon Agric. Exp. Sta. Crop Pest and Hort. Rept. 3: 52–57. *Fig. 12–15.* 1921.—Drying is hastened by dipping the fruit in boiling water or lye solution. A high humidity of the drying air has a tendency to open the pores of the skin and prevent charring. High humidity accompanied by rapid air movement increased the rate of drying, slow movement decreased the rate.—*E. J. Kraus.*

MORPHOLOGY, ANATOMY AND HISTOLOGY OF VASCULAR PLANTS

E. W. SINNOTT, *Editor*

(See also in this issue Entries 639, 730, 755, 892, 916, 984, 1077)

864. ANONYMOUS. [National Herbarium, Sydney, exhibit.] Proc. Linn. Soc. New South Wales 44: 820–821. 1919 [1920].—Note on the exhibit of specimens from the National Herbarium, Sydney, and elsewhere, showing synanthy and syncarpy.—*Eloise Gerry.*

865. ANONYMOUS. [Rev. of: ARBER, AGNES. **The leaves of the irids and the phyllode theory.** (Paper read before Sect. K of the British Assoc. Adv. Sci., August, 1920.)] Jour. Indian Bot. 2: 58–59. 1921.

866. DUNN, GRACE A. **Note on the histology of grain roots.** Amer. Jour. Bot. 8: 207–211. *Fig. 4.* 1921.—Characteristic openings were observed in the root cortex of *Zea mays* and *Triticum vulgare* when grown in water culture. In wheat these openings always appeared whether the culture solution was well or poorly balanced and under a wide range of temperatures. Wheat roots grown in sand or soil, however, showed no such openings. In corn, similar results were obtained in the winter, but in summer, when the temperature was high and growth rapid, fast-growing roots in sand and in soil also showed large openings. It is suggested that the openings appear when the oxygen supply is deficient, as it is likely to be in water culture and in all cases where growth is very vigorous and rapid.—*E. W. Sinnott.*

867. FRITSCH, KARL. **Über den Begriff der Anisokotylie.** [On the concept of anisocotyly.] Ber. Deutsch. Bot. Ges. 38: 69–73. 1920.—The term anisocotyly was proposed by the author in 1904 for the characteristic behavior of the cotyledons of seedlings of certain members of the Gesneriaceae, particularly of the genus *Streptocarpus*. In these plants, and according to the author in none of the plants of other families in connection with which the term has since been used, 1 of the 2 cotyledons, which are approximately equal in size in the seed, develops into a foliage leaf while the other stops growing very soon after germination. He believes that in other cases where the term has been used in reference to unequal size of the cotyledons this inequality exists in the embryo before germination and is due to the cotyledons being bent in the seed or otherwise arranged so that the development of one is mechanically hindered. This condition exists in species of *Gnetum*; in certain genera of the Cruciferae, Moraceae, Phytolaccaceae, Nyctaginaceae, Capparidaceae, Malpighiaceae, Dipterocarpaceae, Cactaceae, and Melastomaceae; and in some species of *Thunbergia* and *Coreopsis*. Cases such as that of *Ranunculus ficaria*, where a single cotyledon is formed by the growing together of 2, have nothing to do with anisocotyly. He reiterates, on the basis of observations of J. BRUNNTHALER in South Africa, his formerly expressed belief that true anisocotyly, as found there in species of *Streptocarpus*, is connected with the habit which these plants have of growing upon precipitous slopes.—*R. M. Holman.*

868. McDOUGALL, W. B. **Thick-walled root hairs of Gleditsia and related genera.** Amer. Jour. Bot. 8: 171–175. *Fig. 3.* 1921.—Root hairs of *Gleditsia triacanthos* become thick-walled and brown within a few days after they are produced. They persist as long as does the root epidermis. These root hairs are regarded by the author as xerophytic structures, persisting from a time when the species grew under xerophytic conditions. Trees with these root hairs have neither bacterial nodules nor mycorrhiza. *Gymnocladus* and *Cercis* sometimes have thick-walled brown root-hairs, but not as characteristically as does *Gleditsia.*—*E. W. Sinnott.*

869. McNAIR, JAMES B. **The morphology and anatomy of Rhus diversiloba.** Amer. Jour. Bot. 8: 179–191. *Pl. 2.* 1921.—The morphology and anatomy of the leaf, stem, root, and flower of this species are described in detail.—*E. W. Sinnott.*

870. Meyer, Fritz Jürgen. **Das Leitungssystem von Equisetum arvense.** [The conducting system of Equisetum arvense.] Jahrb. Wiss. Bot. 59: 263–286. *Fig. 1–7.* 1919.—The author describes the structure and arrangement of all the elements at the node of the aerial sterile stem, the relative positions of protoxylem and metaxylem strands and of the phloem as they pass through the nodal wood; the method of insertion of the leaf and branch traces; the relative positions of the carinal holes in successive internodes and the arrangement of the conducting bundles to conform to these; the path of the conducting system through the nodes and internodes of the rhizome, tuber, leaf of the rhizome, secondary roots, branch roots, sterile stem and its branches and leaves, and the fertile stem and its leaves and cone; the connection between the parts of the system in passing from one organ to another, and the size of the xylem strands both in micromillimeters and in number of tracheids. He discusses the variations in bundle size in different regions of the plant; and the function, size, and formation of the carinal hole.—*J. P. Poole.*

871. Möbius, M. **Die Entstehung der schwarzen Färbung bei den Pflanzen.** [The origin of black coloration in plants.] Ber. Deutsch. Bot. Ges. 38: 252–260. 1920.—The author calls attention to the fact that black coloration in plants is generally not the result of the presence of a truly black pigment but of blue, red, or brown colored substances which, as well as certain histological factors, may produce the same optical effect as would a black pigment. He then presents a classification of the causes of black coloration. Under each of the many headings and subheadings notes are given, and plants are named which illustrate the particular sort of coloration under discussion.—*R. M. Holman.*

872. Neger, F. W., und Th. Kupka. **Beiträge zur Kenntnis des Baues und der Wirkungsweise der Lentizellen. I.** [Contributions to a knowledge of the structure of lenticels and of the manner in which they function.] Ber. Deutsch. Bot. Ges. 38: 141–149. *Fig. 1–6.* 1920.—This paper is concerned with the lenticels of conifers, particularly *Larix, Pseudolarix, Cedrus,* and *Chamaecyparis.* The tissues which may be found in lenticels of conifers are classified by the authors as: (1) "Choriphelloid," making up the greater part of the lenticels and loose in texture with large intercellular spaces; (2) "Porenkork," strips consisting of a few layers of compact brownish cells generally containing small crystals and with very short radial diameter; (3) "Sklerophelloid," lens-shaped groups of compact cells with strongly thickened walls; and (4) fragments of the primary cortex. A key to the commoner species of *Larix* is given, based on the anatomy of the lenticels, and also a similar key by which *Cedrus Libani, C. atlantica,* and *C. Deodara* may be distinguished. Of the 5 species of *Chamaecyparis, C. pisifera* alone lacks lenticels. The other species of the genus, as well as *Thuja* and *Juniperus,* and presumably most other Cupressineae, have lenticels of a new type. The center of the lenticel in these forms consists of a large mass of compact "Porenkork," the cells of which are filled with dark brown contents. Exposure of stems to dilute ammonia gas and subsequent examination of the cortical tissue underneath the lenticel for evidence of injury to the living tissue shows that the central mass of "Porenkork" is impermeable to the gas, which, however, finds easy entrance through thin walled cells without brown contents which lie on either side of the "Porenkork" mass.—*R. M. Holman.*

873. Oakley, R. A., and Morgan W. Evans. **Rooting stems in timothy.** Jour. Agric. Res. 21: 173–178. *Pl. 39–40.* 1921.—There are 2 distinct types of underground rooting stems of *Phleum pratense.* One type develops when the shoot that produces the new plant is covered with soil early in its growth. In such cases, some of the short internodes at the base of the shoot elongate, thereby pushing the shoot to the surface of the soil. Roots spring from the nodes between these elongated internodes. The other type develops when growing culms are covered with soil. Buds that sometimes form on the culms of such plants frequently develop into shoots and ultimately into independent plants. In this case the culm becomes an underground rooting stem.—Aerial rooting stems in timothy are not common in the United States. They may be formed when weak or decumbent plants come in contact with the soil. This character is not of varietal significance.

There are proposed for the types of rooting stems found, especially in grasses, the following terms: Determinate and indeterminate rhizomes, determinate and indeterminate stolons.—*D. Reddick.*

874. SCHÜRHOFF, P. N. **Der Embryosack von Tussilago Farfara. [The embryo sac of Tussilago Farfara.]** Ber. Deutsch. Bot. Ges. 38: 217–219. *Fig. 1.* 1920.—It is the micropylar megaspore which develops into the embryo sac in this plant. Preparations of mature embryo sacs showed 6 2-nucleate antipodals, or 6 4-nucleate, or 12 2-nucleate, so that in most cases 24 antipodal nuclei were present. Although in some Compositae in which the micropylar megaspore develops into the embryo sac the other 3 megaspores take part in the development of the antipodal tissue, that is not the case in *Tussilago Farfara.* The author calls attention to the apparent systematic significance of the development of the chalazal or of the micropylar megaspore into the embryo sac in different tribes of the Compositae.—*R. M. Holman.*

MORPHOLOGY AND TAXONOMY OF BRYOPHYTES

ALEXANDER W. EVANS, *Editor*

(See also in this issue Entry 663)

875. CORBIÈRE, L., ET E. JAHANDIEZ. **Muscinées du Département du Var. [Bryophytes of the department of the Var (France).]** Ann. Soc. Hist. Nat. Toulon 4 (Suppl.): 1–63. 1921.—The present report on the bryophytes of the department of the Var is dedicated to the late Lieut. M. MOURET, upon whose collections it is largely based. After citing the earlier works which deal with the region in question, the authors enumerate 248 mosses and 51 hepatics, omitting certain records about which the evidence seems to be insufficient. Each species is accompanied by full data regarding stations and collectors, and many critical notes are interpolated, those dealing with *Fissidens Moureti* Corb. and *Grimmia Pitardi* Corb. being particularly full. The following new varietal names or combinations are proposed: *Cephaloziella Turneri* var. *dentata* (Raddi) Douin, based on *Jungermannia dentata* Raddi in part; *Fabronia pusilla* var. *nervosa* Thériot, based on *F. Schimperiana* Br. eur. not De Not.; and *Trichostomum brachydontium* var. *unguiculatum* (Philib.) Corb. & Jahand., based on *Hymenostomum unguiculatum* Philib. and including *Weisia Alberti* Corb. as a synonym.—*A. W. Evans.*

876. FLEISCHER, MAX. **Über die Entwicklung der Zwergmännchen aus sexuell differenzierten Sporen bei den Laubmoosen. [Development of dwarf males from sexually differentiated spores in the mosses.]** Ber. Deutsch. Bot. Ges. 38: 84–92. *Pl. 2 (colored), 1 fig.* 1920.—The author worked particularly on the following 3 species: *Macromitrium Blumei, Schlotheimia Koningsbergeri,* and *Trismegistia Brauniana.* In all 3 species he found that the male plants were always dwarf and epiphytic on the female plants. A morphological difference thus exists between male and female plants. Evidence was abundant that the dwarf male plants developed from a primary protonema, that is, had their origin in spores which lodged on the vegetative portions of the female plants. In the *Macromitrium* and the *Schlotheimia* spores of different sizes were found, and the larger spores, containing the greater supply of food, gave rise apparently to the dwarf plants. In *Trismegistia Brauniana* dwarf female plants, as well as dwarf male plants, were found on normal female plants. The dwarf female plants, however, were too young to show archegonia and would probably have developed into normal female plants. These various observations lead the author to conclude that the protonemata of these 3 species are dioecious and that heterospory (sexual differentiation) exists in the spores.—*H. Bergfried.*

877. FLEISCHER, MAX, UND LEOPOLD LOESKE. **Iconographia bryologica universalis.—Abbildungen von Moosen aus allen Erdteilen nach Originalzeichnungen sowie aus bryologischen Werken. Serie I: Auswahl von Abbildungen aus Loeske: "Die Laubmoose Europas." [Universal bryological iconography. Illustrations of mosses from all parts of the earth according**

to original drawings or from bryological works. Series I: Selection of illustrations from Loeske's "Mosses of Europe." *40 pl.* Max Lande: Berlin-Schöneberg, 1918.—The present fascicle is the initial number of a series in which it is planned to illustrate a wide selection of mosses. The 40 plates were all drawn from European specimens and represent 80 species belonging to 36 genera. The figures were mostly prepared by P. JANZEN and show individual plants, leaves, and capsules, as well as numerous anatomical details. In connection with each plate, full data are supplied regarding the figures, and the sources of the specimens used in the preparation of the drawings are likewise definitely given. Otherwise there is no descriptive text.—*A. W. Evans.*

878. HOLZINGER, JOHN M. **Notes [on Physcomitrium pygmaeum].** Bryologist **24**: 26–27. 1921.—The article consists of 2 notes supplementary to a paper by ELIZABETH G. BRITTON. The 1st note states that *Physcomitrium pygmaeum* is probably autoicous and adds details regarding spores; the 2nd note records a new station in Minnesota, based on material collected by J. H. SANDBERG, and establishes definitely the autoicous inflorescence of the species.—*E. B. Chamberlain.*

879. POTTIER, JACQUES. **Recherches sur le développement de la feuille des mousses. [Studies on the development of the leaf in mosses.]** *25 × 61 cm., viii + 144 p., 32 pl.* Imprimerie Durand: Chartres, 1920.—The author first gives a critical account of the work previously done on the development of moss leaves, beginning with an article by MORREN, which appeared in 1840. His own investigations were made on serial microtome sections, and in several cases reconstructions of young leaves in plastiline were prepared. The mosses studied included the following species, representing various natural groups: *Andreaea crassinervia, A. angustata, Mnium undulatum, M. punctatum, Funaria hygrometrica, Dicranum scoparium, Atrichum undulatum, Barbula ruralis,* and *Leucobryum glaucum. Andreaea crassinervia* and *Mnium undulatum* are described and figured in great detail, and plastiline models of leaves in various stages of development are shown in photographic reproduction. The other species are treated more briefly. As a result of his studies the author draws the following conclusions: (1) A moss leaf grows by means of an initial cell only at the beginning of its development; (2) the region of active cell division, in the course of the ontogeny of the leaf, is shifted from the apex to the base; (3) the apex is differentiated very early; (4) in certain species of *Andreaea* with costate leaves, the initial cell sometimes shows 2 cutting faces, as in the more highly evolved mosses; (5) in *Mnium punctatum*, the leaf-margins are not comparable with the nerve in their development; (6) groups of "sténocystes" (auxiliary cells) in the nerve do not always originate in the same way; (7) *Leucobryum glaucum* shows an asymmetry in its leaves, agreeing in this respect with the other mosses.—*A. W. Evans.*

MORPHOLOGY AND TAXONOMY OF FUNGI, LICHENS, BACTERIA, AND MYXOMYCETES

H. M. FITZPATRICK, *Editor*

(See also in this issue Entries 653, 980, 1030, and those in the section Pathology)

FUNGI

880. BEELI, M. **Note sur le genre Meliola Fr. Especes et variétes nouvelles recoltées au Congo. [Note on the genus Meliola Fr. New species and varieties collected in the Congo.]** Bull. Jard. Bot. Etat [Bruxelles] 7: 89–160. 1920.—A general synopsis of the species of *Meliola* based on morphological characters and host relationships is given. A number of new species and new varieties are described. A new genus, **Meliolinopsis**, is founded for species with cylindrical, persistent, 8-spored asci, the type species being given as *M. megalospora* (Rehm) Beeli. The 2 genera, *Meliola* and *Meliolinopsis*, are recognized, the former being subdivided into the sub-genera *Meliolina, Irene,* and *Meliolaste.* An analytical key to genera and subgenera is given.—*Henri Micheels.*

881. DANA, B. F. **Two new species of Sclerotinia.** [Abstract.] Phytopathology 11: 106. 1921.—*Sclerotinia demissa* n. sp. attacks leaves, twigs and fruits of *Prunus virginiana*. *Sclerotinia gregaria* n. sp. attacks the leaves and fruits of *Amelanchier cusickii*.—*B. B. Higgins.*

882. DOIDGE, ETHEL M. **Some changes in nomenclature of South African Ascomycetes.** South African Jour. Nat. Hist. 2: 39–41. 1920.—A number of changes in the nomenclature of South African Ascomycetes have been rendered necessary by the appearance of the recent work of Theissen and Sydow. Thirteen new combinations resulting from the transfer of species from *Meliola* to *Irene* are here given.—*E. M. Doidge.*

883. GERHARDT, KARL. **Über das Auftreten der Schlauchfrüchte von Oidium Tuckeri am Weinstock. [On the appearance of ascocarps of Oïdium Tuckeri on grapevines.]** Ber. Deutsch. Bot. Ges. 38: 156–158. 1920.—In October and November, 1919, the author found perithecia of *Uncinula necator* on old plants of grape in the Jena botanical garden. This is only the 2nd reported occurrence of the ascocarps in Germany. The author describes the perithecia and reports attempts, as yet unsuccessful, to germinate the ascospores. He attributes the production of the perithecia to the unusually abrupt fall in temperature in the vicinity of Jena in the middle of October 1919. Their absence from green leaves, relative scarcity on red leaves, and abundance on yellow fallen leaves in which no anthocyanin had been formed suggested a disturbance of transfer of material in the leaf resulting from the sudden depression of the temperature as the cause of the production of the ascocarps.—*R. M. Holman.*

884. HÖHNEL, FRANZ VON. **Über Pseudopeziza, Pyrenopeziza, Ephelina, und Spilopodia. [On Pseudopeziza, Pyrenopeziza, Ephelina, and Spilopodia.]** Ber. Deutsch. Bot. Ges. 38: 96–101. 1920.—The author discusses the synonymy and relationships of these genera. He considers the genus *Pyrenopeziza* to be made up in part of overwintered forms of *Pseudopeziza*. The remaining species of the genus *Pyrenopeziza* he assigns to the genus *Excipula*.—*R. M. Holman.*

885. HÖHNEL, FRANZ VON. **Über die Gattung Phlyctaena Desmazières. [On the genus Phlyctaena Desmazières.]** Ber. Deutsch. Bot. Ges. 38: 102–110. 1920.—The author states that 2 fungi, in his opinion generically distinct, were described as the type of this genus under the name *Phlyctaena vagabunda*. One of these grew on the stem of *Psoralea bituminosa*, the other on that of *Tamus communis*. Inasmuch as the fungus on *Tamus* has typical pycnidia, in contradiction to Desmazières' generic description, and since the fungus on *Psoralea* was described as having false perithecia formed only by the blackened epidermis, the writer concludes that the fungus on *Psoralea* is the type species of the genus. The form growing upon *Tamus* he considers identical with *Ascochyta caulium* Libert, and concludes on the basis of characteristics indicating its close affinity to *Rhabdospora* that it must be called *R. caulium* (Lib.) v. H., at least until a critical investigation of the genus *Rhabdospora* is undertaken. The synonymy of other published species of *Phlyctaena* is also discussed.—*R. M. Holman.*

886. HÖHNEL, FRANZ VON. **Über Botryosphaeria, Epiphyma und Pilgeriella. [On Botryosphaeria, Epiphyma, and Pilgeriella.]** Ber. Deutsch. Bot. Ges. 38: 111–116. 1920.—The author discusses the synonymy and relationships of a number of species of the genera named. He states that *Gibberella* Sacc. 1877 is the same as *Botryosphaeria* Ces. et de Not. 1863, that according to the laws of nomenclature the species of *Gibberella* must be placed in *Botryosphaeria* Ces. et de Not., and that for the species of the genus *Botryosphaeria* Sacc. the name *Melanops* Nitschke 1869 must be employed. The author denies the sharp distinction which Theissen assumes in the development of the nucleus of the Pseudosphaeriaceae, Sphaeriales, and Dothideales. *Botryosphaeria* Sacc. 1877 he considers a genus of the Dothideaceae. *Botryosphaeria Dothidea* (Moug.) Ces. et de Not. he places in *Catacauma* as *C. Dothidea* (Moug.) v. H. The author's *Botryosphaeria Molluginis*, which was placed by Theissen and Sydow (Ann. Mycologici 13: 297. 1915) in the genus *Amerodothis*, he now, on the basis of further study, places in *Dothidella* as *D. Periclymeni* (Fckl.) var. *Molluginis* v. H. or *Dothi-*

della Molluginis v. H.; and *Botryosphaeria anceps* v. H. he transfers provisionally to *Wallrothiella*. He questions whether the new genus *Epiphyma* established by Theissen for the fungus last mentioned is sufficiently distinct from *Wallrothiella* and states that in any event it is not one of the Pseudosphaeriaceae. *Pilgeriella perisporioides* P. Henn., though superficial in its growth, he considers a typical member of the Pseudosphaeriaceae.—*R. M. Holman.*

BACTERIA

887. Jennison, Harry Milliken. **Bacillus atrosepticus van Hall the cause of the blackleg disease of Irish potatoes.** [Abstract.] Phytopathology 11: 104. 1921.—A comparative study of subcultures from *Bacillus atrosepticus* van Hall, *B. phytophthorus* Appel, *B. solonisaperus* Harrison, *B. melanogenus* Pethybridge and Murphy, and of the potato blackleg organism isolated from diseased potatoes in various parts of the United States, show that they are all the same organism. Because of priority *Bacillus atrosepticus* van Hall is retained as the proper name for the organism.—*B. B. Higgins.*

PALEOBOTANY AND EVOLUTIONARY HISTORY

Edward W. Berry, *Editor*

(See also in this issue Entries 668, 769, 1100)

888. Berry, Edward W. **A palm nut from the Miocene of the Canal Zone.** Proc. U. S. Nation. Mus. 59: 21–22. *Fig. 3.* 1921.—The author describes the nuts of *Iriartites Vaughani*, a new species, from the Miocene Gatun formation of the Panama Canal Zone.—*E. W. Berry.*

889. Berry, Edward W. **Tertiary fossil plants from Costa Rica.** Proc. U. S. Nation. Mus. 59: 169–185. *Pl. 22–27.* 1921.—In addition to *Heliconia* sp., *Hieronymia lehmanni*, *Buettneria cinnamomifolia*, and *Nectandra areolata*, the author describes the following new species from the Miocene of Costa Rica: *Piperites cordatus*, *P. quinquecostatus*, *Ficus talamancana*, *Anona costaricana*, *Inga sheroliensis*, *Goeppertia tertiaria*, *Nectandra woodringi*, and *Phyllites costaricensis*.—*E. W. Berry.*

890. Berry, Edward W. [Rev. of: Arber, E. A. N. **Devonian floras.** *100 p., 47 fig.* University Press: Cambridge, 1921 (see Bot. Absts. 8, Entry 2086).] Amer. Jour. Sci. 1: 514–515. 1921.

891. Sahni, B. **Petrified plant remains from the Queensland Mesozoic and Tertiary formations.** Queensland Geol. Surv. Publ. 267. *48 p., 5 pl., 10 fig.* 1920.—This paper gives the results of a study of large collections of petrified woods from the Triassic, Jurassic, and Tertiary of Queensland. The 2 petrified fern stems described by Kidston and Gwynne Vaughan as *Osmundites gibbiana* and *O. dunlopi* from the Jurassic of Otago, New Zealand, are recorded from the Jurassic Walloon series of Queensland. The following new species of coniferophyte woods are described: *Cedroxylon brisbanense* from the Triassic Ipswich series; *Cupressinoxylon walkomi*, *C. dunstani*, and *Mesembrioxylon sewardi* from the Jurassic Walloon series; and *M. fusiforme* and *M. fluviale* from the Tertiary. The genus *Mesembrioxylon* is a recent proposal of Seward for woods from the Jurassic to the Tertiary which resemble *Podocarpus* and *Phyllocladus*, but of uncertain botanical affinity. Two different species of dicotyledonous woods are described from the Tertiary, *Pataloxylon scalariform* and *P. porosum;* the genus is new, and no hint as to its botanical affinity is given.—*E. W. Berry.*

892. Wieland, G. R **Monocarpy and pseudomonocarpy in the cycadeoids.** Amer. Jour. Bot. 8: 218–230. *Pl. 4, fig. 1.* 1921.—The author discusses, with illustrations, the monocarpic habit or the production of fruit once in a normal lifetime. This habit is confined at present to angiosperms. He suggests that certain of the Cretaceous cycadeoids were also monocarpic, since specimens have been found in which great numbers of cones, all apparently of the same age, are borne over the whole trunk, indicating that the plant had entered its single reproduc-

tive period. A case of "pseudomonocarpy" is cited in *Pinus attenuata*, where the mature cones do not drop off but are embedded in the trunk and often do not shed their seeds till the tree dies. The author also calls attention to the xerophyllous characters of the cycadeoids, as shown particularly by the dense masses of scaly ramentum with which the stems and leaves are covered. He believes that the early Cretaceous climate, under which they throve, was a rather dry and cool one.—*E. W. Sinnott.*

893. Yabe, H., and S. Endo. **Discovery of stems of a Calamites from the Paleozoic of Japan.** Sci. Rept. Tohoku Imp. Univ. (Geology) 5^2: 93–95. *Pl. 15, fig. 7–8.* 1921.—A detailed description and illustration of a calamite of the Arthropitys type from the marine Chichibu formation (upper Paleozoic) of Japan is presented.—*E. W. Berry.*

PATHOLOGY

G. H. Coons, *Editor*

C. W. Bennett, *Assistant Editor*

(See also in this issue Entries 612, 639, 644, 653, 735, 791, 794, 832, 881, 887)

PLANT DISEASE SURVEY (REPORTS OF DISEASE OCCURRENCE AND SEVERITY)

894. Anonymous. **Mosaic disease of canes.** Jour. Jamaica Agric. Soc. 24: 313–314. 1920.—A report of the occurrence of the mosaic (mottling) disease of sugar cane in Jamaica is given. Governmental regulations providing for the eradication of the disease are also given. —*John A. Stevenson.*

895. Anonymous. **Plaga blanca de las cebollas.** [White disease of onions.] Rev. Agric. [Mexico] 5: 601–602. *1 fig.* 1920.—A disease of onions due to *Fusarium* sp. has caused losses to growers near Ciudad Victoria, Tamaulipas, Mexico.—*John A. Stevenson.*

896. Byars, L. P. **Notes on the citrus-root nematode, Tylenchulus semipenetrans Cobb.** Phytopathology 11: 90–94. *Fig. 1.* 1921.—Examination of trees in all the principal Citrus growing sections of Florida indicates that the nematode disease of Citrus trees occurs in only 3 isolated localities, namely, Glen St. Mary, Gainesville, and Brooksville. Tests of the hot water treatment for infested seedlings indicate that it may be developed into a feasible method of control.—*B. B. Higgins.*

897. Garrett, A. O. **Septoria Negundinis Ellis & Ev. in Zion National Park.** Phytopathology 11: 100. 1921.

898. Heald, F. D. **Some new hosts for the Rhizoctonia disease.** [Abstract.] Phytopathology 11: 105. 1921.—*Rhizoctonia* has been found attacking strawberries (*Fragaria* sp.) and wild onions (*Allium* sp.).—*B. B. Higgins.*

899. Heald, F. D. **The skin spot (Oospora pustulans) of the Irish potato.** [Abstract.] Phytopathology 11: 104–105. 1921.—In a car load of potatoes shipped from British Columbia 95 per cent showed lesions of this disease.—*B. B. Higgins.*

900. Jennison, Harry Milliken. **Observations upon the bacterial blight of field and garden peas in Montana.** [Abstract.] Phytopathology 11: 104. 1921.—A very serious disease of field and garden peas (*Pisum sativum* L.) is produced by *Pseudomonas pisi* Sack. Dissemination is thought to be due largely to contaminated seed.—*B. B. Higgins.*

901. Madariaga, A. **Plagas y enfermedades del maiz.** [Diseases and pests of corn.] Rev. Agric. [Mexico] 4: 449–455. 1919.—The rust (*Puccinia*) and smut (*Ustilago maydis*) of Indian corn are discussed.—*John A. Stevenson.*

902. MEDALLA, M. G., AND G. M. REYES. **Fiji disease of sugar cane.** Philippine Farmer 7: 3, 5. 1921.—The paper presents a discussion of Fiji disease to the sugar cane growers of the Philippines. The disease is described and its recent introduction into the Philippines demonstrated. According to the authors it is at present confined to the Islands of Mindoro and Luzon. The organism (suspected of being of protozoan nature) discovered by Dr. H. L. LYON is constantly associated with the disease. Control attempts in the Philippines have been undertaken based upon: (1) A domestic quarantine of the affected provinces; (2) the distribution of resistant varieties in provinces where the disease occurs; and (3) selection of disease-free seed on affected plantations.—*H. Atherton Lee.*

903. MELCHERS, L. E. **Physoderma (zeae-maydis?) in Kansas.** Trans. Kansas Acad. Sci. **29**: 131–132. 1920.—The presence of this fungus in Kansas on *Zea mays* is noted; pertinent characteristics are given.—*F. C. Gates.*

904. MELCHERS, L. E. **Plant disease report for Kansas, 1917.** Trans. Kansas Acad. Sci. **29**: 132–138. 1920.—The paper contains a brief report of the distribution and severity of 25 cereal diseases, 11 vegetable diseases, 16 fruit diseases, and winter injury.—*F. C. Gates.*

905. RAMÍREZ, ROMÁN. **Viruela del algodon.** [Cotton rust.] Rev. Agric. [Mexico] 5: 461. *3 fig.* 1920.—Cotton rust caused by *Aecidium gossypii* E. & E. has caused losses to growers in Coahuila and Duranga, Mexico.—*John A. Stevenson.*

906. SIMONETTO, MOISÉS. **Nuevas orientaciones en sanidad vegetal.** [**New situations in plant pathology.**] Rev. Agric. Com. y Trab. [Cuba] **3**: 349–356. *4 fig.* 1920.—In part 1 of the paper are discussed the dangers of the importation of plant diseases and the preventive measures that may be taken. A floating fumigation building is suggested and described. In part 2 reference is made to a convention on plant sanitation held in Washington on December 20, 1920. In part 3 an outline is presented of urgently needed investigation on the concomitant causes of the mosaic of sugar-cane. In part 4 it is pointed out that in some cases mosaic disease has caused losses reaching 50 per cent and is thus a real danger to Cuban sugarcane growers. One focus of infection located at the Mercedes plantation is said to have been controlled.—*F. M. Blodgett.*

907. TRUJILLO PELUFFO, AGUSTIN. **Desarrollo de las enfermedades criptogamicas en las viñedos durante el presente año.** [**Fungous diseases in the vineyards during the present year.**] Defensa Agric. [Uruguay] 2: 43–46. *3 fig.* 1921.—Powdery mildew (*Oidium*), anthracnose (*Gloeosporium*), and downy mildew (*Plasmopara*) have caused heavy losses due in part to weather conditions (high humidity) but to a larger extent to the failure of the growers to spray at the right time and in a careful manner.—*John A. Stevenson.*

THE HOST (RESISTANCE; SUSCEPTIBILITY; MORBID ANATOMY AND PHYSIOLOGY)

908. HURD, ANNIE MAY. **Seed-coat injury and viability of seeds of wheat and barley as factors in susceptibility to molds and fungicides.** Jour. Agric. Res. **21**[2]: 99–122. *Pl. 13–23.* 1921.—An unbroken seed coat affords protection against attack of living seeds by *Penicillium* sp. or *Rhizopus nigricans* either in damp storage, in the soil, or in blotter germinations; but infection may occur on such seeds if germination is retarded by means of low temperature. By means of artificial injuries, it is found that injury over the endosperm results fatally when either organism is present and under any 1 of the 3 conditions mentioned, while an injury over the embryo is not at all detrimental. Seeds that are dead or weakened from any cause are attacked by these fungi even though the seed coat is intact. These fungi do not affect seeds when the temperature is 10°C. or lower and *Penicillium* sp. requires an atmospheric humidity of 80 per cent. *Aspergillus* sp. grows on wheat at a humidity of 70 per cent.—Seeds mechanically injured and exposed to copper sulphate solution [3 per cent] are injured in 5 minutes when the break is over the embryo and in 1 hour if the break is over the endosperm.—The dam-

age that will be done to seed wheat by copper-sulphate treatment and by saprophytic fungi can be predicted by examination of the physical condition of the seed for mechanical injury and the location of the injuries. Machine thrashing usually breaks seed coats of wheat directly over the radicle. Turkestan barley and varieties of similar structural type are broken at the hilum either in machine or hand thrashing and barley seed is more easily injured than wheat seed.—Perfect wheat seed is injured by exposure to saturated copper sulphate solution for 6 hours or more, indicating that the seed coat is not completely semipermeable.—*D. Reddick.*

909. KORSTIAN, CLARENCE F., CARL HARTLEY, LYLE F. WATTS, AND GLENN G. HAHN. **A chlorosis of conifers corrected by spraying with ferrous sulphate.** Jour. Agric. Res. 21[3]: 153–171. *4 fig.* 1921.—All coniferous species grown in a nursery in Idaho are affected with chlorosis. With chlorosis is associated poor growth of roots, stems and leaves, failure to form terminal buds, and susceptibility to winter injury. Excessive soil moisture does not seem to be a factor in producing a chlorotic condition. The soils on which chlorosis of conifers occurs all contain considerable amounts of carbonate and have been formed in part from limestone. The water supply at one nursery contains much calcium bicarbonate. No correlation could be found between occurrences of chlorosis and the amount of calcium or of carbonate present. Chlorosis in western yellow pine, *Pinus ponderosa*, and jack pine, *P. banksiana*, has been definitely corrected by spraying the plants at 10-day intervals with 1 per cent ferrous sulphate. Douglas fir, *Pseudotsuga taxifolia*, gave similar but less decisive results. Sulphate of iron of 2 per cent strength is injurious.—The literature on chlorosis is reviewed and a bibliography of 24 titles appended.—*D. Reddick.*

910. LEE, H. ATHERTON. **The increase in resistance to citrus canker with the advance in maturity of citrus trees.** Phytopathology 11: 70–73. 1921.—On the evidence obtained through extensive field observations, the hypothesis is advanced that as citrus trees advance in maturity there is a gradual increase in their resistance to citrus canker. Citrus trees of the more resistance species, *Citrus nobilis*, *C. mitis*, etc., often show great susceptibility to canker when young while more mature trees are practically free from injury. This is apparently true also, to a less noticeable extent, of the more susceptible species.—*B. B. Higgins.*

911. SCHAFFNIT, E. **Untersuchungen über die Brennfleckenkrankheit der Bohnen. [Investigations on anthracnose of beans.]** Mitteil. Deutsch. Landw. Ges. 36: 199–201. 1921.—Bean varieties resistant and susceptible to anthracnose were grown with various fertilizers, especially those supplying an excess of nitrogen. The plants as well as controls were inoculated with the anthracnose organism, but no appreciable change in relative resistance was found as a result of the fertilizer applications. Greater diastase and protease content was found in the susceptible than in the resistant varieties.—*Wilber Brotherton, Jr.*

THE PATHOGENE (BIOLOGY; INFECTION PHENOMENA; DISPERSAL)

912. BURKHOLDER, WALTER H. **The bacterial blight of bean: a systemic disease.** Phytopathology 11: 61–69. 1921.—The bean blight organism (*Bacterium phaseoli*) may infest the vascular system of the bean (*Phaseolus vulgaris*) plant, with or without the production of surface lesions and symptoms of bean blight as generally noted. The bacteria in the cotyledons of plants from infected seed may enter the vessels and pass down into the stem of the young plants. The symptoms produced by this vascular invasion appear to depend, in some way, on environmental conditions. The plants may wilt at once, lesions may appear on the stems and leaves, or the plants may show incipient wilting or dwarfing without the appearance of definite lesions. The seeds are often invaded through the vessels without the production of lesions on either the seed coat or the pod.—This systemic infection does not produce the greatest amount of damage, but it is of importance in seed selection. It also acts as an important source of infection for the peculiar epidemics of blight which appear in late summer. —*B. B. Higgins.*

913. Heald, F. D. **Relation of spore load to the per cent of stinking smut (Tilletia tritici).** [Abstract.] Phytopathology 11: 103–104. 1921.—The per cent produced is approximately proportional to the number of smut spores per grain of wheat until the maximum is reached, between 65,000 and 100,000 per grain.—*B. B. Higgins.*

914. Heinricher, E. **Arceuthobium Oyxcedri (DC.) M. Bieb auf Cupressus. [Arceuthobium Oxycedri (DC.) M. Bieb on Cupressus.]** Ber. Deutsch. Bot. Ges. 38: 220–223. 1920. —This paper is a report of experiments carried out with the intention of testing the ability of the organism named to attack *Pinus silvestris*, *Cupressus pendula*, and *Chamaecyparis pisifera*. Positive results were secured with *Cupressus* spp. only. Since only 1 out of 67 seeds sown on the cypress developed into a plant on that host the author does not consider the negative results with *Chamaecyparis* as conclusive evidence of the parasite's inability to use the latter as a host.—*R. M. Holman.*

915. Morse, W. J. **The transference of the potato late blight by insects.** Phytopathology 11: 94–96. 1921.—A case is noted where the spores of the potato late blight fungus (*Phytophthora infestans*) were apparently carried 150 yards by flea beetles (*Epitrix cucumeris*).—*B. B. Higgins.*

DESCRIPTIVE PLANT PATHOLOGY

916. Anonymous. **Degeneración de la papa y manera de evitarla. [Degeneration of the potato and means of preventing it.]** Rev. Agric. [Mexico] 4: 415–421. *5 fig.* 1919.—Degeneration of potato varieties is due partly to *Phytophthora infestans* and other fungi and partly to unknown causes. The tendency of certain varieties toward degeneration, expressed by low yields, spindling sprouts and related phenomena, is often allied with smooth, shallow-eyed tubers. A lack of diastase in the tubers and poor fibro-vascular development also mark this condition.—*John A. Stevenson.*

917. Anonymous. **Report on Pè-byu-gale disease and the application of measures to check its spread, 1918-19.** Appendix to Ann. Rept. Agric. Sta., Agric. Chem., Agric. Eng., Asst. Bot. Northern Circle, and Asst. Entomol. Burma 1918-1919: 95–99. *1 map.* 1920.—This is a sclerotial disease on Pè-byu-gale (*Phaseolus lunatus* L.) reported as exceedingly destructive over localized areas near Mandalay, Burma. Despite burning badly infected fields, and rotation of crops, the disease is spreading. [See also Bot. Absts. 9, Entry 941.]—*Winfield Dudgeon.*

918. Barss, H. P. **Bean blight and bean mosaic.** Oregon Agric. Exp. Sta. Crop Pest and Hort. Rept. 3: 192–196. *Fig. 56–59.* 1921.—Notes and recommendations are given relative to the occurrence and control of blight, probably caused by *Bacterium phaseoli*, and of mosaic. The variety Berrendo from Mexico shows no symptoms of mosaic even when artificially inoculated, yet after inoculation it may transmit the disease to other varieties.—*E. J. Kraus.*

919. Barss, H. P. **Physiological disorders of developing fruits.** Oregon Agric. Exp. Sta. Crop Pest and Hort. Rept. 3: 159–166. *Fig. 44–47.* 1921.—The following are assumed to be due to a lack of adjustment between water needs and water supply: (1) Shriveling of grapes; (2) drouth spot, cork, blister, punk, and bitter pit of apple; (3) black end of pears and of walnuts; (4) gum spot of prunes; and (5) internal browning of potato.—*E. J. Kraus.*

920. Bianchi, Angel T. **Enfermedades de la papa. [Potato diseases.]** Defensa Agric. [Uruguay] 2: 31–32. 1921.—*Phytophthora infestans*, *Fusarium solani* (dry rot), and *Bacillus amylobacter* (wet rot) are considered.—*John A. Stevenson.*

921. Bryon, May K. **A bacterial budrot of cannas.** Jour. Agric. Res. 21[2]: 143–152. *Pl. 31–38.* 1921.—The disease is essentially one of young tissue and moist conditions in *Canna indica*. The lesions vary from small spots to brown irregular areas extending several centimeters along the leaf blade. Young shoots are often killed, the flower buds blighted, and

the stalks decayed. The disease is known only from Washington, D. C., and Urbana, Illinois. The cause of the disease is *Bacterium cannae* n. sp., group number 211. 3333023. Cultural and other biological characters are presented in detail. Infection takes place through stomates and spreads through the intercellular spaces of the parenchyma of leaf blade, petiole, and stalk. Overcrowding and overwatering of young plants in the hothouse seem to be predisposing factors. Avoidance of these conditions is at present the only known means of controlling the disease.—*D. Reddick.*

922. GARDNER, MAX W., AND JAMES B. KENDRICK. **Bacterial spot of tomato.** Jour. Agric. Res. 21[2]: 123–156. *Pl. 24–28.* 1921.—Bacterial spot of tomato [*Lycopersicum*] is widely distributed in North America. It is a typical spot disease of fruit, stem, and leaf. It occurs on practically all varieties of tomatoes and also on pepper [*Capsicum*]. Infection of potato foliage has been secured. The disease is caused by *Bacterium exitiosum* n. sp., group number 211. 3332513. Cultural and other biological characters are described in detail. The organism produces no acid or gas with carbohydrates, is highly sensitive to sunlight, very resistant to desiccation, and has its limit of acid toleration at P_H5.—Infection of foliage is stomatal and is readily secured by atomizer inoculations; fruit infections occur only through wounds. Mature fruits are not infected and this is attributed to high acidity. The organism overwinters on the surface of seed and is thus disseminated. Disinfection of seed in mercuric chloride, 1 to 3000, for 5 minutes is safe and effective for control.—The paper is a monographic treatise. —*D. Reddick.*

923. GENTNER, GEORG. **Eine Bakteriose der Gerste.** [**A bacteriosis of barley.**] Centralbl. Bakt. II. Abt. 50: 428–441. *Fig. 2.* 1920.—A monographic treatise on a bacterial disease of barley, occasionally found on wheat and rye. The disease is characterized by the appearance of brown spots on the nodes and upper internodes. The leaves of diseased plants are covered with brown blotches or dots, the upper ones becoming prematurely yellow and dry. The disease is further characterized by the production of poorly filled heads with prematurely filled kernels. The glumes may become split. In extreme cases, the kernels may show longitudinal rifts extending deep into the endosperm. The disease is caused by *Bacillus cerealium* n. sp., described as follows: Short, motile rod, 1.5–3 × 0.6–0.8μ, with 1–2 polar flagella; spore forming, aerobic, non-liquefying, red-pigment producing on media. The bacillus is capable of dissolving the middle lamella, starch grains, and cell walls in the interior of the kernel, but not in the hull. It does not dissolve cellulose of filter paper, nor does it rot potato or carrot. The cleavage products and the pigment produced are dextrin-like. The disease is most common in dry seasons. The organism persists in the soil and in the grain, which under conditions of moist storage may become seriously infested.—*Anthony Berg.*

924. HEALD, F. D. **Moldy core of Stayman Winesap.** [Abstract.] Phytopathology 11: 105. 1921.—Several species of fungi have been found producing a moldy growth in the core of apples having an open calyx; but of these only species of *Penicillium* and of *Alternaria* produced a decay of the fruit.—*B. B. Higgins.*

925. HOTSON, J. W. **A new species of Exobasidium.** [Abstract.] Phytopathology 11: 106. 1921.—A new, as yet unnamed, species of *Exobasidium* attacks the young branches of *Vaccinium parvifolium.*—*B. B. Higgins.*

926. JAGGER, IVAN C. **Bacterial leafspot disease of celery.** Jour. Agric. Res. 21: 185–188. *Pl. 46–47.* 1921.—The disease is practically confined to leaf blades of celery [*Apium graveolens*] and is known from New York and Michigan. The lesions are distinguishable from those of Septoria leaf blight only by the absence of pycnidia. The cause of the disease is *Pseudomonas apii* n. sp., group number 211. 2322033. Cultural and other biological characters are presented in condensed form.—Field experiments show that the disease may be controlled by suitable applications of Bordeaux mixture, 1 per cent, but that lime-sulphur solution, 1:25, is not effective.—*D. Reddick.*

927. Lehman, S. G. **Soft rot of pepper fruits.** Phytopathology 11: 85–87. 1921.—A hitherto unknown rot of sweet pepper (*Capsicum annuum* var. *grossum*) fruit is described. It appears first as a small water-soaked spot at the blossom end. The infected area enlarges rapidly, becomes lighter in color and soft, and after a period of 4 or 5 days involves the entire fruit. The causal organism is a phycomycete which seems to be identical with *Pythium de Baryanum*.—*B. B. Higgins.*

928. McKay, M. B. **Blossom-end rot of tomatoes.** Oregon Agric. Exp. Sta. Crop Pest and Hort. Rept. 3: 185–186. *Fig. 52.* 1921.—The relation of the disease to water supply, and suggestions for its control are given.—*E. J. Kraus.*

929. McKay, M. B. **Mosaic disease of tomatoes.** Oregon Agric. Exp. Sta. Crop Pest and Hort. Rept. 3: 179–184. *Pl. 14, fig. 51–52.* 1921.—Effects of the disease on foliage and fruit are described. General discussion, notes on occurrence in Oregon, and suggestions for control are presented.—*E. J. Kraus.*

930. McKay, M. B. **Western yellow tomato blight.** Oregon Agric. Exp. Sta. Crop Pest and Hort. Rept. 3: 174–178. *Fig. 50.* 1921.—Both *Fusarium* and *Rhizoctonia* appear to be associated with the disease, though the former seems to be the more common and important. There are no resistant varieties, but such are being sought. Occurrence and means for decreasing losses are discussed.—*E. J. Kraus.*

931. Miles, L. E. **The mosaic disease of sugar cane in Mississippi in 1920.** Mississippi Agric. Exp. Sta. Bull. 191. *12 p., 1 fig.* 1920.—A brief history of the disease is given, its symptoms, and distribution over the state; quarantine and control measures are also mentioned.—*H. B. Brown.*

932. Neal, D. C. **Diseases of the sweet potato in Mississippi and their control.** Mississippi Agric. Exp. Sta. Bull. 190. *16 p., 12 fig.* 1920.—In an illustrated popular bulletin, the author discusses the economic importance of the most common sweet potato diseases, their symptoms, causes, control measures, and distribution over the state. A short bibliography is appended.—*H. B. Brown.*

933. Pritchard, F. J., and W. S. Porte. **Collar-rot of tomato.** Jour. Agric. Res. 21: 179–184. *Pl. 41–45.* 1921.—This disease of tomato (*Lycopersicum*) takes the form of a rotting and girdling of the stem of young plants at the surface of the soil. It is essentially a disease of the seed-bed and occurs in Maryland, New Jersey and Delaware. The disease is caused by *Verticillium lycopersici* n. sp.; a technical description is presented.—Infection experiments were made with this fungus in comparison with *Macrosporium solani* and *Rhizoctonia solani*. All 3 organisms produce a girdling of stems of seedling tomatoes when applied to the uninjured stems or when mixed with the potting soil. *R. solani* often fails to infect and the lesions are superficial. Trials with potato (*Solanum tuberosum*) and with horse nettle (*S. carolinense*) show that these plants are also hosts for the 3 organisms with typical collar rot development, but, as with tomato, *Rhizoctonia solani* is weakly parasitic.—*D. Reddick.*

934. Ramiréz, Ramón. **Enfermedad en los naranjos de Turicato, Michoacan.** [An orange disease in Turicato, Michoacan.] Rev. Agric. [Mexico] 5: 547. *1 fig.* 1920.—A rot of oranges due to *Penicillium* sp., *Aspergillus* sp. and other molds following initial injury by insects is described.—*John A. Stevenson.*

935. Ramiréz, Ramón. **Enfermedad de los pinos de Guadalajara.** [A pine disease in Guadalajara.] Rev. Agric. [Mexico] 5: 601. *1 fig.* 1920.—A disease of the twigs of *Pinus* sp. due to *Schizotrichum* sp. is described briefly.—*John A. Stevenson.*

936. Ritzema Bos, J. **Myn proefveldje by het Instituut voor Phytopathologie van 1906 tot 1920.** [My experiment field at the Phytopathological Institute during the period 1906–1920.] Tijdschr. Plantenz. 27: 29–44. 1921.—In this work the results obtained upon various phy-

topathological subjects are summarized: (1) Recovery of diseased plants after transplanting to the experiment field; (2) soil sickness; (3) production of sclerotia of *Claviceps purpurea* in large quantities; (4) ergot of rye in relation to grasses; (5) use of chemicals as fungicides and insecticides; (6) control of celery leaf spot (*Septoria apii*) with Bordeaux mixture.—*D. Atanasoff.*

937. Rosen, H. R. **Further observations on a bacterial root and stalk rot of field corn.** Phytopathology 11: 74–79. *Fig. 1–4.* 1921.—In continuing work formerly reported [see Bot. Absts. 3, Entry 2742] field observations and inoculations have shown that 17 varieties of field corn and 1 of sweet corn are susceptible to this disease. The latter is characterized by localized rotting of the roots and lower nodes of the stalk, and by spots on the blades, sheaths, and husks. The organism has been obtained in 15 isolations from the various types of lesions; and similar lesions have been reproduced by inoculations with pure cultures of the organism, which is as yet unnamed.—*B. B. Higgins.*

938. Schultz, E. S., and Donald Folsom. **Leafroll, net-necrosis, and spindling-sprout of the Irish potato.** Jour. Agric. Res. 21: 47–80. *Pl. 1–12.* 1921.—The symptoms, geographical distribution, and economic importance of leafroll are briefly discussed. The disease is found to be consistently carried over winter in the tubers. It can be transmitted by means of grafts, using either parts of diseased tubers or scions from diseased plants. The plants show leafroll symptoms about 1 month after inoculation as well as in their progeny. Observations made in the field and in the greenhouse indicate that aphids are agents of transmission. Experiments with caged plants in the field and in the greenhouse show that aphids are able to transmit leafroll. Two tuber units were inoculated in the field with *Myzus persicae*, both developing symptoms of leafroll, and showing leafroll in a large percentage of their progeny. Eight plants were inoculated with aphids in the greenhouse and all developed leafroll, while checks grown from the same tubers remained healthy even though some of them were fed upon by non-virulent aphids. An experiment on overwintering in the soil gave negative results. Tubers showing net-necrosis almost invariably produce leafroll plants, although leafroll plants only occasionally produce net-necrosis tubers. Net-necrosis often fails to appear in the progeny of tubers affected with it. The development of net-necrosis by leafroll tubers seems to depend on the variety, time of infection, and other factors not now understood. Net-necrosis is one of the causes of spindling sprout. Experiments with rogueing indicate that this method of control will be effective in northeastern Maine under proper conditions. Leafroll appears to spread less readily than mosaic.—*K. H. Fernow.*

939. Stevens, F. L. **Foot-rot of wheat.** Science 51: 517–518. 1920.—From evidence gathered from a study of the foot-rot disease the author presents the following facts as fully established. The fungus was isolated from lesions in practically every one of several hundred attempts, and no other species of fungus or other parasite was constantly present. The lesions were always penetrated and occupied by a fungus mycelium that agrees in general character with the fungus in question, and the diseased stems, when placed in humid surroundings, became covered with spores of the fungus. The fungus when inoculated from pure cultures as spores, mycelium, or infected wheat tissue produced disease indistinguishable from foot-rot. Wheat planted in soil with an inoculum of this fungus developed typical foot-rot. The fungus in question is a typical *Helminthosporium.* This foot-rot found in Illinois should be recognized as a disease quite distinct from all others of similar type that have been previously described. It is clearly soil-borne and probably also seed-borne.—*A. H. Chivers.*

940. Taubenhaus, J. J. **A study of the black and the yellow mold of ear corn.** Texas Agric. Exp. Sta. Bull. 270. *38 p., 10 fig.* 1920.—The annual loss in Texas from black and yellow molds, *Aspergillus niger* and *A. flavus*, is estimated at 5,718,333 bushels. The same molds attack broom corn and stored onions. The black mold is the more destructive to corn.—Tests indicated that while *Aspergillus niger* is found on peanuts, cotton bolls, cowpeas, onions, pomegranates, Irish potatoes, squashes, broom corn, and ear corn, physiological species do

not exist. *Aspergillus niger* can invade the ear only during the milky stage and when it has been injured by the ear worm. Tests show that infected ears should not be used as seed stock.—*L. Pace.*

941. Thompstone, E., and A. M. Sawyer. **Report on the work of the Botanical Section, Northern Circle.** Ann. Rept. Agric. Sta., Agric. Chem., Agric. Eng., Bot. Northern Circle, and Asst. Entomol. Burma 1918–1919: 93–95. 1920.—Progress is reported in investigation of a destructive sclerotial disease of *Phaseolus lunatus* [see Bot. Absts. 9, Entry 917]; cotton breeding; and other experimental work.—*Winfield Dudgeon.*

942. Walker, J. C. **Onion smudge.** Jour. Agric. Res. 20: 685–721. *Pl. 80–85.* 1921.—Smudge occurs only on the scales and neck of the bulb of *Allium cepa*. The causal organism is *Colletotrichum circinans* (Berk.) Voglino, heretofore generally known as *Vermicularia circinans* Berkeley. The fungus is pathogenic upon the scales of mature bulbs, but does not attack actively growing parts of the plant with the exception of young seedlings, upon which it sometimes produces "damping off." The fungus overwinters as stromata in infected scales. Conidia are sensitive to desiccation except when remaining in waxy masses on the host; in this latter condition a small percentage remain viable for a considerable period. Abundant rainfall, together with a mean soil-temperature range between 20 and 30°C., favor the rapid development of the disease in the field; hot dry weather in midsummer checks its development. Artificial drying of "sets" immediately following harvest also checks the disease but is not as yet recommended as a general practice.—*H. W. Dye.*

943. Walker, J. C. **Rust of onion followed by a secondary parasite.** Phytopathology 11: 87–90. *Fig. 1–2.* 1921.—A species of *Botrytis* has been found attacking the leaves and seed stems of the top onion (*Allium cepa* var. *bulbellifera*). It enters the host plant always through lesions produced by a rust, apparently *Puccinia asparagi*.—The identity of the *Botrytis* has not yet been determined.—*B. B. Higgins.*

944. Weir, James R. **Polyporus dryadeus (Pers.) Fr. on conifers in the Northwest.** Phytopathology 11: 99. 1921.

945. Zeller, S. M. **A Cytospora canker of apple and another "die-back" fungus of interest.** [Abstract.] Phytopathology 11: 105. 1921.

946. Zeller, S. M. **A spur blight of pear caused by Botrytis.** [Abstract.] Phytopathology 11: 105. 1921.

947. Zeller, S. M. **Heart-rot of prune and peach in Oregon.** [Abstract.] Phytopathology 11: 105. 1921.—In western Oregon the greater percentage of heart-rot in peach (*Amygdalus persica*) and prune (*Prunus domestica*) trees is due to *Trametes carnea*. *Lenzites sepiaria* and *Fomes pinicola* also cause some heart-rot in these trees.—*B. B. Higgins.*

948. Zeller, S. M. **Wood decay in orchard trees in Oregon.** Oregon Agric. Exp. Sta. Crop Pest and Hort. Rept. 3: 132–138. *Fig. 35–37.* 1921.—The organisms causing most serious decay of cherry wood are *Irpex lacteus*, *Polystictus versicolor*, and *P. hirsutus*; of apple and pear wood *P. versicolor*; and of prune wood *Trametes carnea*, *Lenzites sepiaria*, *Fomes pinicola*, *Stereum hirsutum*, and others. Of trees having large pruning wounds a survey showed 97 per cent to be decayed. Painting of the wounds with Bordeaux paste, and about the edges with a mixture of asphalt and paraffin, is recommended. Copper nails or tacks driven into the wound will supplement the antiseptic action of the Bordeaux paste.—*E. J. Kraus.*

ERADICATION AND CONTROL MEASURES

949. Barss, H. P. **Cylindrosporium leaf-spot of prune and cherry.** Oregon. Agric. Exp. Sta. Crop Pest and Hort. Rept. 3: 156–158. *Fig. 42–43.* 1921.—Control is effected by spray-

ing with Bordeaux mixture (4-4-50) on May 1 and at intervals of 3 or 4 weeks thereafter until dry weather is permanently established.—*E. J. Kraus.*

950. BARSS, H. P. **Grain smuts and their control.** Oregon. Agric. Exp. Sta. Crop Pest and Hort. Rept. 3: 197-202. *Fig. 60-63.* 1921.—General description and methods of control are given.—*E. J. Kraus.*

951. BARSS, H. P. **Onion smut control.** Oregon. Agric. Exp. Sta. Crop Pest and Hort. Rept. 3: 187-191. *Fig. 54-55.* 1921.—Experiments with, and recommendations concerning, the use of formaldehyde during seeding are given.—*E. J. Kraus.*

952. BARSS, H. P. **Peach leaf-curl control.** Oregon. Agric. Exp. Sta. Crop Pest and Hort. Rept. 3: 145-151. *Pl. 12-13.* 1921.—Notes are given on comparative effectiveness of several sprays containing copper, sulphur, or coal tar derivatives, and the time of application of spray. Thorough spraying with Bordeaux mixture (6-6-50) any time between December 1 and the first part of February resulted in almost perfect control.—*E. J. Kraus.*

953. BARSS, H. P., AND W. A. SMART. **Notes on tests with fungicides.** Oregon Agric. Exp. Sta. Crop Pest and Hort. Rept. 3: 167-171. *Fig. 48.* 1921.—The discussion relates to (1) preliminary tests with late summer sprays for apple-tree anthracnose, (2) sugar as a stabilizer for Bordeaux mixture, (3) iron sulphide, an effective aid to thoroughness in spraying, (4) dry-lime-sulphur vs. ordinary liquid lime-sulphur. Experimental data are briefly presented.—*E. J. Kraus.*

954. BROCK, W. S., AND W. A. RUTH. **Judging a spray by its chemical content.** Proc. Amer. Soc. Hort. Sci. 17: 105-106. 1920 [1921].—The authors point out that a spray material should not be judged solely by its chemical content as such important properties as solubility, rate of decomposition, adhesiveness, absorption of components of the spray or its decomposition products, the effect of light, heat, and moisture upon the material and upon the relation of the material to the plant and to the fungus to be controlled may be ignored. Although the Sherwin-Williams Company recommends a dilution for their dry lime-sulphur which yields a spray containing less sulphur than is present in a liquid lime-sulphur generally accepted as controlling apple fungi and San José scale, the recommended concentration has been found successful in Illinois during 5 years for controlling apple fungi and in 2 localities for 2 years in controlling San José scale. For dependable results repeated field trials in the immediate vicinity seem to be necessary.—*H. W. Richey.*

955. GESCHWIND. **Die in den Schwarzkiefernsaatkämpen des Karstes auftretenden schädlichen Insekten und Pilze sowie die Mittel zu ihrer Abwehr.** [Insects and fungi in the Austrian pine nurseries of the Karst region and the means of combating them.] Wiener Allg. Forst- u. Jagd Zeitg. 39: 29-30. 1920.—The chief insect enemies of Austrian pine (*Pinus austriaca*) in the nurseries of the Karst region on the east Adriatic coast are discussed as well as the needle cast disease (*Lophodermium pinastri*) and the root decay caused by *Fusoma parasiticum* (*Fusarium blasticola*). There are well known ways of combating all of these pests but the author considers only the effect of laying sods, grass side down, between the drills in the seed beds. The system of laying these sods was developed primarily as a means of protection against high winds and drying effects and also as a means of adding humus to the soil. The method has proved of considerable help in checking insect attack. The activity of the root-decaying fungus seems to depend upon air stagnation. The sods allow a much greater circulation of air over the seed beds than when they are protected from drying out by lattice frames or leafy branches spread over the beds.—*F. S. Baker.*

956. HOLMES, E. M. **The silver-leaf disease fungus.** Pharm. Jour. 106: 31-32. 1921.—*Stereum purpureum*, proved by PERCIVAL to be the cause of the silver-leaf disease of the plum tree and the Portugal laurel, is described by the author, and directions are given for collecting and burning the fungus, which matures during the late winter and early spring.

The fungus spores attack the trees where the bark is cracked and where gum often exudes from wounds. Probably the best way to prevent attack is to apply pine tar to every crack or abrasion of the bark. It is also suggested that an antiseptic resin, such as a combination of formaldehyde with a resinous base, might be devised as a more sightly remedy.—*E. N. Gathercoal.*

957. Mackie, W. W., and F. N. Briggs. **Fungicidal dusts for control of smuts.** Science 52: 540. 1920.—It has been demonstrated recently that the commonly accepted standard smut treatments with either copper sulphate or formaldehyde are frequently injurious, either producing poor germination or weakening the seedling. Formaldehyde injury seems more severe with wheat when plantings are made in dry soil. Injury from copper sulphate treatments are greater with wheat mechanically injured, as in the threshing process. As an improved method, dust applications of copper sulphate are recommended. Little Club wheat was dusted with spores of *Tilletia tritici* at the rate of 1 part smut spores to 750 parts of seed by weight, and treated by standard formulas as well as by the dust method. Dehydrated copper sulphate mixed with equal parts of calcium hydrate, at the rate of 2 ounces per bushel, controlled smut without injury to germination.—*A. H. Chivers.*

958. Owens, C. E. **Gooseberry mildew control.** Oregon Agric. Exp. Sta. Crop Pest and Hort. Rept. 3: 152–155. *Fig. 39–41.* 1921.—Complete control may be obtained by 3 applications of lime-sulphur spray. The 1st of these at a dilution of 1–25, put on when the leaves are emerging from the buds, is most important; the 2nd (1–45) should be put on just before blooming, the 3rd (1–50) just after blooming.—*E. J. Kraus.*

959. Scofield, C. S. **Cotton root rot in the San Antonio rotations.** Jour. Agric. Res. 21^{2}: 117–125. 1921.—Records are presented covering 8 years on the occurrence of root rot of cotton [caused by *Phymatochitrium omnivorum*] in experimental plots in Texas involving continuous cropping and rotations with various crops of 2, 3, and 4 years respectively. The data indicate that "the control of root rot is not to be found through any ordinary system of crop rotation or of tillage methods."—*D. Reddick.*

960. Snapp, Oliver I., and Leslie Pierce. **Experiments in dusting and spraying peaches for the control of curculio, brown rot, and scab.** Mississippi Agric. Exp. Sta. Bull. 195. *8p., 1 fig.* 1920.—Liquid sprays gave slightly better results than dust but required more labor in applying. Dust (lead arsenate 10 per cent, lime 10 per cent, and sulphur 80 per cent) applied on April 22, May 11, and June 12 controlled brown rot and scab effectively but did not control the curculio, as 19.8 per cent of the fruit produced was wormy.—*H. B. Brown.*

961. Zundel, George L. **Preliminary experiments on injury to wheat from seed treatment in Washington.** [Abstract.] Phytopathology 11: 103. 1921.—Both copper sulphate solution (1 pound to 5 gallons) and formaldehyde solution (1 to 40) injured seed wheat. The injury was greatly reduced when such treatment was followed by dipping the seed 3–5 minutes in lime solution.—*B. B. Higgins.*

MISCELLANEOUS (TECHNIQUE, COGNATE RESEARCHES)

962. G., C. G. [Rev. of: Chittenden, F. J. **The garden doctor: plants in health and disease.** *x + 154 p.* Country Life: London; Chas. Scribner's Sons: New York, 1920.] Nature 107: 40. 1921.

963. Hesler, L. R. [Rev. of: Smith, Erwin F. **An introduction to bacterial diseases of plants.** *xxx + 688 p., 453 fig.* W. B. Saunders Co.: Philadelphia and London, 1920.] Phytopathology 11: 107–108. 1921.

964. Orton, C. R. **Lightning injury to potato and cabbage.** Phytopathology 11: 96–98. *Fig. 1.* 1921.

965. RATHBUN, ANNIE E. **Methods of direct inoculation with damping-off fungi.** Phytopathology 11: 80–83. *Fig. 1–3.* 1921.—In order to overcome some of the uncertainties encountered in testing the susceptibility of plants to damping-off fungi by placing the organism in the soil, methods of direct inoculation have been devised. By these methods the organism, growing on culture media, is brought into direct contact with the stem, root, or whatever part of the plant seems most desirable for the test.—*B. B. Higgins.*

PHARMACOGNOSY AND PHARMACEUTICAL BOTANY

HEBER W. YOUNGKEN, *Editor*
E. N. GATHERCOAL, *Assistant Editor*

(See also in this issue Entries 633, 658, 661, 664, 728, 936, 956.)

966. BALME, JUAN. **Cultivo de la adormidera blanca. [Poppy cultivation.]** Rev. Agric. [Mexico] 4: 428–429 1919.—Brief cultural directions for *Papaver somniferum candidum* are given, including methods of harvesting the product and the yields to be expected.—*John A. Stevenson.*

967. BLISS, A. R. **Report on alkaloids.** Jour. Assoc. Official Agric. Chem. 4: 416–420. 1921.—The report deals with strychnine, quinine, physostigmine, hyoscyamine, and others.—*F. M. Schertz.*

968. BUSCHMANN, E. **Untersuchungen über die chemischen Bestandteile von Bulbus Scillae. [Chemical constituents of Bulbus Scillae.]** Arch. der Pharm. 257: 79–86. 1919.

969. DEHRS, V. **Contribution à l'étude du Quebracho rouge. [Contribution to the study of red quebracho.]** Bull. Sci. Pharm. 28: 48–54. 1921.—The paper, which is an abstract of B. GALARZA's paper from the "L'Institut de Botanique et de Pharmacologie de la Faculté des Sciences Médicales de Buenos Aires," No. 32, 1915, gives a very detailed account of the collecting of the wood of red quebracho (*Schinopsis Lorenzii* and *S. Balensae*), its physical and chemical properties, and its use.—*H. Engelhardt.*

970. DEHRS, V. **Étude des Aspidospermées. [Study of the aspidospermae.]** Bull. Sci. Pharm. 28: 54–61. 1921.—A discussion of EDWIN ROTHLIN's paper, "a contribution to the study of the Aspidospermae," from the Instituto de botanica y farmacologia de Buenos Aires. It deals with the botanical, microscopical, pharmacological, and chemical studies of *Aspidosperma quebracho blanco* and *Aspidosperma peroba.*—*H. Engelhardt.*

971. DIETERLE, H. **Xanthosterin, ein krystallinischer Körper aus der Rinde von Xanthoxylum Budrunga DC. [Xanthosterin, a crystalline body from the bark of Xanthoxylum Budrunga.]** Arch. der Pharm. 257: 260–263. 1919.

972. FERENEZ, A. **Ueber das Kardobenediktenkrautöl. (Cnicus Benedictus L.) [Oil of blessed thistle.]** Arch. der Pharm. 257: 180–190. 1919.—The oil contains 89.80 per cent unsaturated or fluid fatty acids and 3.68 per cent saturated or solid fatty acids. Analysis of the former gave 74 per cent oleic acid and 26 per cent linoleic acid; of the latter 40 per cent stearic acid and 60 per cent palmitic acid. Specific gravity of *Cnicus Benedictus* oil (15°C.) is 0.9262, acid number 1.2, refraction index 1.47178. Other physical and chemical constants are given, and details of separation of the fatty acids.—*H. G. Barbour.*

973. FOCKE, C. **Zur künftigen physiologischen Einstellung der offizinellen Digitalisblätter. [Physiological testing of digitalis.]** Arch. der Pharm. 257: 270–288. 1919.—This discussion appears to be of local interest for Germany.—*H. G. Barbour.*

974. FRIEDRICHS, O. VON. **Ueber einige Inhaltsstoffe der Altheewurzel. [Some constituents of Althaea root.]** Arch. der Pharm. 257: 288–298. 1919.—The content in fatty oil is

1.7 per cent. The latter consists of glycerides of palmitic and oleic acids, also of butyric acid and phytosterin; probably also a high molecular oxy-acid.—The odor of the root is carried by a constituent of unknown composition, non-volatile with steam, soluble in ether but not in petroleum ether.—A lecithin, containing palmitic and oleic acids and choline, is present. The sugar is chiefly cane sugar (10.2 per cent); the invert-sugar content was 0.78 per cent. The gummy portion contains numerous polysaccharides, 64 per cent consisting of glycosan. Galactose is not present (as formerly held), but another saccharocolloid, which yields *d*-galactose on hydrolysis, is present.—*H. G. Barbour.*

975. Gadamer, J. **Zur Kenntnis der Chelidonium-Alkaloide. [Chelidonium alkaloids.]** Arch. der Pharm. 257: 298–303. 1919.—Studies in stereo-isomerism are presented.—*H. G. Barbour.*

976. Grant, E. H. **Report on balsams and gums.** Jour. Assoc. Official Agric. Chem. 4: 421. 1921.—A method is given for the determination of crude fiber in Karaya gum.—*F. M. Schertz.*

977. Greenish, Henry G., and Constance E. Pearson. **A new source of santonin.** Pharm. Jour. 106: 2–3. 1921.—*Artemisia brevifolia*, found abundantly in western Thibet, at an altitude of 9,000–14,000 ft., and in northern India from Kashmir to Kumaon at a somewhat lower altitude, yields at least 1 per cent of santonin. As far as is at present known, santonin is not widely distributed in the genus *Artemisia*. Apart from *A. maritima* var. *Stechmanniana* Besser, the unexpanded flower-heads of which constitute commercial santonica and contain from 2 to 3 per cent of santonin, it has been found only in *A. gallica*.—*E. N. Gathercoal.*

978. Harrison, C. W. **The pharmacopoeial assay for alcohols in santal oil extended to include the true acetyl value.** Jour. Assoc. Official Agric. Chem. 4: 425–427. 1921.—The method as submitted gives the ratio of the saponification number of the acetylated oil to the acetyl value, and when expressed as santalol furnishes a significant figure for detecting adulterations.—*F. M. Schertz.*

979. Heiduschka, A., und K. Lüft. **Das fette Oel der Samen der Nachtkerze (Oenothera biennis) und über eine neue Linolensäure. [Fatty oil of evening primrose seed and a new linoleic acid.]** Arch. der Pharm. 257: 33–69. 1919.—In 100 gm. of the oil of evening primrose seed the following constituents, expressed in grams, were found: γ-linoleic acid 2.21, α-linoleic acid 33.65, β-linoleic acid 26.67, oleic acid 25.77, palmitic acid and high molecular acids 5.22, caproic acid 0.78, unsaponifiable constituents 2.27. γ-linoleic acid was not previously described; its hexabrom derivative has a melting point of 195–196°C.—*H. G. Barbour.*

980. Hermann, E. **Ein neuer Giftpilz. [A new poisonous fungus.]** Pharm. Zentralhalle 61: 511–513. 1920.—Two cases of poisoning could be traced to the eating of a fungus which at first was considered as *Inocybe frumentacea* or *I. sambucina* but later was determined by Romell as *I. lateraria*. The fungus is extremely poisonous, patients dying within 2 hours after previously suffering from vertigo, burning pain in the urinary tract, vomiting, and blindness. Persons who have not eaten a fatal amount of the fungus become blind, but regain eyesight within 24 hours. A detailed description of the structural characteristics of the fungus is given.—*H. Engelhardt.*

981. Holdermann, R. **Kirschlorbeerwasser und eine künstliche Darstellungsweise für Aq. Amygdalarum amararum. [Cherry laurel water, and an artificial preparation of water of bitter almonds.]** Arch. der Pharm. 257: 69–71. 1921.

982. Luther, J. B. **The Turner reaction for gurjun balsam.** Jour. Assoc. Official Agric. Chem. 4: 422–424. 1921.—A report is presented on the Turner reaction as applied to imports of copaiba to test for the presence of gurjun balsam as an adulterant.—*F. M. Schertz.*

983. McCutcheon, Alexander. **Cascara sagrada (Rhamnus Purshianus DC.) grown in Scotland.** Pharm. Jour. 106: 72–73. 1921.—An account is given of the growth of *Rhamnus*

Purshianus seedlings, planted some years ago in East Lothian, Scotland. The plants have not developed into trees, but retain rather the bushy habit of growth. They are now about 9 feet high. Some 2 years ago bark was peeled from a number of branches, dried, and made into the official fluid extract. The latter possessed the full therapeutic value of the best North American Cascara sagrada. It would be quite feasible to grow and harvest this drug in Scotland.—*E. N. Gathercoal.*

984. McNair, James B. **A study of Rhus diversiloba with special reference to its toxicity.** Amer. Jour. Bot. 8: 127–146. *Pl. 1, fig. 2.* 1921.—The author discusses the taxonomy of this species, particularly its relationship to *R. toxicodendron*, and outlines the distribution of the species.—The fresh sap emulsion secreted by the resin canals is apparently the only portion of the plant which causes poisoning of the skin (dermatitis). Those parts of the plant which do not possess canals,—the anthers, pollen, xylem, epidermis, cork cells, and trichomes,—are therefore non-toxic. The virulency of the plant in its different growth stages is discussed.—*E. W. Sinnott.*

985. Marsh, C. Dwight, A. B. Clawson, and W. W. Eggleston. **Baccharis pteronioides as a poisonous plant of the Southwest.** Jour. Amer. Vet. Med. Assoc. 57: 430–434. *Fig. 1–2.* 1920.—Suspicion has been thrown on *Baccharis pteronioides* as a possible cause of some losses of live stock in the Southwest [U. S. A.]. Feeding experiments have shown the plant to be poisonous to sheep, and it may be presumed that it will affect cattle in a similar way. A short description of the plant is given.—*C. D. Marsh.*

986. Pammel, L. H. **Equisetosis or horsetail poisoning.** Vet. Med. 16: 43. 1921.—A report is made of a case of horse poisoning, with additional data, mostly from Pammel's manual.—*C. D. Marsh.*

987. Pammel, L. H. **Some forms of lima beans poisonous.** Vet. Med. 16: 45. 1921.—A distinction is made between lima beans, some varieties of which are poisonous, and butter beans, which are not poisonous.—*C. D. Marsh.*

988. Pammel, L. H. **Three-flowered nightshade poisonous.** Vet. Med. 16: 46–47. 1921.—An account is given of the fatal poisoning of 2 horses, with details of the symptoms and autopsy findings.—*C. D. Marsh.*

989. Pammel, L. H. **Will frosted Sudan grass produce poisoning?** Amer. Jour. Vet. Med. 15: 27. 1920.—In reply to this query the author briefly discusses the subject.—*C. D. Marsh.*

990. Ramírez, Román. **Drimys mexicana Sessé et Moc.** Rev. Agric. [Mexico] 4: 426. *1 fig.* 1919.—The cultivation of *Drimys mexicana* Sessé et Moc, the bark of which is used for medicine, is discussed.—*John A. Stevenson.*

991. Spokes, Ray E. **American styrax.** Jour. Amer. Pharm. Assoc. 9: 1055–1060. 1920.—A study of American styrax collected in the vicinity of Atlanta. The American styrax was found to be of firmer consistency than the South American product, in this respect resembling European styrax. The author reports the following analyses:

	(a)	(b)	(c)	U. S. P. STANDARD
	per cent	*per cent*	*per cent*	
Incineration residue	1.4	1.4	1.4	Not more than 1 per cent
Acid value	35.0	39.0	37.0	Not more than 86
				Not less than 56
Undissolved residue	3.0	3.5	3.6	Not more than 2.5 per cent
Cinnamic acid (free)	12.07	13.84	13.75	*Saponification value*
Resin esters	34.1	35.5		Not more than 230
Styrol	1.1	1.6		Not less than 170

The author was unable to isolate styresinol in a seemingly pure state. The volatile oil (1.5–2.0 per cent) obtained by steam distillation has been identified as styrol, $C_6H_5CH: CH_2$ a phenyl substitution product of ethylene and identical to that obtained from Oriental species; it has a boiling point of 145°C., sp. gr. of 0.070, and is dextrorotatory 16° 30'. The author was unable to isolate styrogenin, a white amorphous body, reported to be present in styrax. Methods of collection and range of distribution are given, the latter according to the author extending from Connecticut to southeastern Missouri, south to Tampa Bay, Florida, through Arkansas and Oklahoma to Texas, and then south to Mexico. It is stated that the outlook for larger use of American styrax seems encouraging.—*Anton Hogstad Jr.*

992. Viehoever, Arno. **Report on medicinal plants.** Jour. Assoc. Official Agric. Chem. 4: 409–415. 1921.—The report concerns itself with new sources of supplies or proper substitutes for drugs not now obtainable; value of volume-weight determinations in the analysis of crude drugs and spices; value of micro-sublimation in the analysis of plant products; the condition of domestic and imported drugs.—*F. M. Schertz.*

993. Wallis, T. E. **Analytical microscopy.** Pharm. Jour. 106: 48–50. *Fig. 1.* 1921.—The concluding paper of this series presents counting methods, illustrated by the *Lycopodium* spores and the maize starch procedure, and the preparation of crude fiber for counting.—*E. N. Gathercoal.*

994. Winterstein, E., und A. Weinhagen. **Beiträge zur Kenntnis der Arekaalkaloide: Ueber Guvacin und Isoguvacin. [Areca alkaloids: Guvacin and isoguvacin.** Arch. der Pharm. 257: 1–12. 1919.—Chemical isolation of two isomeric bases, $C_6H_9NO_2$, guvacin and isoguvacin, from the strongly concentrated mother liquid of arecolin. Guvacin is said to be Δ^3 tetrahydronicotinic acid. Isoguvacin is possibly a pyrrol derivative.—*H. G. Barbour.*

995. Zörnig-Basel, H. **Beiträge zur Pharmakogeographie. [Pharmaco-geography.]** Arch. der Pharm. 257: 129–144. 1919.—An extensive catalogue of commercial products of African and neighboring colonies is presented. Political ownership of these colonies seems to be based on the status in 1913.—*H. G. Barbour.*

PHYSIOLOGY

B. M. Duggar, *Editor*
Carroll W. Dodge, *Assistant Editor*

(See also in this issue Entries 599, 610, 634, 686, 694, 700, 794, 801, 815, 817, 824, 866, 871, 872, 883, 908, 909, 911, 919, 928, 964, 974, 975, 1068, 1071)

DIFFUSION, PERMEABILITY, ADSORPTION

996. Fitting, Hans. **Untersuchungen über die Aufnahme und über anomale osmotische Koeffizienten von Glyzerin und Harnstoff. [Investigations relative to the absorption and the abnormal osmotic coefficients of glycerine and urea.]** Jahrb. Wiss. Bot. 59: 1–170. 1919.

997. Knudson, L., and S. Ginsburg. **Suggestions with respect to the measurement of osmotic pressure.** Amer. Jour. Bot. 8: 164–170. *Fig. 1.* 1921.—The osmotic concentration of the leaf cells of *Zebrina pendula* and *Iresine Herbstii* was determined both by the cryoscopic and the plasmolytic methods. A piston cylinder for the expression of the cell sap is described. The experiment shows that a pressure of 50,000 lbs. yields a more concentrated sap than does one of 10,000 lbs. The method of freezing the tissue was not found to affect the results greatly. Considerable differences were observed in the osmotic pressure when determined by the plasmolytic and by the cryoscopic methods, the latter giving in every case a higher figure.—*E. W. Sinnott.*

998. KOLKWITZ, R. **Die künstliche Zelle.** [An artificial cell.] Ber. Deutsch. Bot. Ges. 38: 136–140. *Fig. 1.* 1920.—The author describes the construction of a new device by which water absorption by osmosis, artificial turgor pressure, and secretion of water as the result of high turgescence may be easily demonstrated. The apparatus consists of (a) a portion which is similar in form to the expanded part of a thistle tube and of about 100 cc. capacity, (b) a glass stopcock, and (c) an approximately cylindrical portion of about 5 cc. capacity into which a tube with an internal diameter of several mm. may be fixed by means of a stopper. The 3 parts of the apparatus are of glass and made in 1 piece. The stopcock connects the narrower end of member "a" with "c," and is so bored that by proper adjustment the chamber of "a" may be made to communicate with the chamber of "c." Either "a" or "c" may be placed in communication with the atmosphere, or the entrance to both chambers may be closed. An animal membrane is stretched across the large open end of "a," and in the demonstration of water secretion the open end of "c" is closed with parchment paper or some vegetable membrane. Directions for the use of the apparatus are given.—*R. M. Holman.*

999. RUDOLFS, W. **Effect of salt solutions having definite osmotic concentration upon absorption by seeds.** Soil Sci. 11: 277–293. *2 fig.* 1921.—The influence of single salt solutions, varying from 0.001 to 7.0 atmospheres, of calcium nitrate, potassium carbonate, magnesium sulphate, potassium dihydrogen phosphate, sodium chloride, potassium chloride, and sodium nitrate upon water absorption by seeds was determined. Seeds of wheat, corn, watermelon, buckwheat, Canada field pea, white lupine, soybeans, rape, and alfalfa were used. There is a marked difference in the absorbing power of seeds of different species. The highest rates were found in alfalfa, the lowest in corn. Average absorption rates show a linear relation to the osmotic concentration of the solutions, decreasing with increase in concentration except in dilute solutions. The retardation of absorption is accomplished by osmotic action. Low concentrations have a stimulating effect upon the absorption of some seeds but not upon that of others.—*W. J. Robbins.*

MINERAL NUTRIENTS

1000. HAENSELER, C. M. **The effect of salt proportions and concentration on the growth of Aspergillus niger.** Amer. Jour. Bot. 8: 147–163. *Fig. 6.* 1921.—*Aspergillus niger* was grown on 3-salt solutions of 3 different total concentrations (0.5, 2.1, and 4.2 atmospheres) and in the presence of sugar. For each total concentration, all possible combinations obtainable by varying the partial concentration of each salt by increments of $\frac{1}{10}$ of the total concentration were made. In certain cases the salts were kept constant and the concentration of the sugar was changed. When the salt proportions were the same, an increase in total concentration gave an increase in the yield of the fungus (dry weight). The partial concentrations of KH_2PO_4 and $MgSO_4$ were varied within wide limits without in any way affecting the yields. Yield is approximately proportional to the amount of NO_3 present, whether this amount is the result of changes in total or partial concentration. Beyond a certain point, the concentration of sugar is the limiting factor in growth. When salt concentrations and proportions are constant, yield is nearly proportional to the sugar concentration of the nutrient solution.—*E. W. Sinnott.*

1001. MITCHELL, J. H. **Report on inorganic plant constituents.** Jour. Assoc. Official Agric. Chem. 4: 391–394. 1921.—Methods are reported for determining calcium, magnesium, and manganese in the presence of large amounts of phosphorus. The method is adapted for use with certain seeds, cereals, and legumes.—*F. M. Schertz.*

1002. TRUE, RODNEY H. **The function of calcium in the nutrition of seedlings.** Jour. Amer. Soc. Agron. 13: 91–107. 1921.—The results were obtained by growing seedlings in laboratory cultures. Pure water represents a partial ionic vacuum to roots of plants and tends to establish an equilibrium with the cell contents by the withdrawal of ions from the plant. Injurious action results and is not fully overcome by any pair of ions (salt) tested, but is very

largely overcome by salts yielding the Ca^{++} ion, to a much less degree by those yielding the Mg^{++} ion, and very slightly or not at all by those yielding the K^{+} or Na^{+} ions. The calcium salts absorbed most abundantly are $CaCl_2$, $CaCO_3$, and $Ca(NO_3)_2$. Absorption of electrolytes is increased by an increase in the number of kinds of nutrient ions present in the solution. When accompanied by Ca^{++} ions, the K^{+} ions—neglected when offered in simple solutions—are absorbed. As the variety of ions present in the solution is increased, the importance of rather sharply marked proportional relations becomes distinctly less than in the simpler solutions. The most striking single chemical condition of the solution is the presence of a certain minimal quantity of Ca^{++} ions. A certain minimal quantity of Ca^{++} ions seems to be necessary to secure the normal absorption of the other required ions present in the soil solution. Ca ions evidently make "physiologically available" the other nutrient materials contained in the soil solution. The basis, then, for an understanding of special service performed by the Ca^{++} ion is doubtless to be sought in the physiology of the cell.—*F. M. Schertz.*

PHOTOSYNTHESIS

1003. STERN, KURT. **Untersuchungen über Fluorescenz und Zustand des Chlorophylls in lebenden Zellen. [The fluorescence of chlorophyll, and its condition in living cells.]** Ber. Deutsch. Bot. Ges. 38: 28–35. 1920.—By means of the spectroscope the author has studied the fluorescence of living cells of *Chlorella* suspended in water and of solutions of chlorophyll in various lipoids. Since fluorescence was observed in the suspension of living cells and n the solutions in lipoids, but never in the colloidal solutions in water, even when various substances were added which might be conceived of as rendering chlorophyll in colloidal solution in the chloroplast fluorescent, he concludes that in the intact green cell the chlorophyll is in true solution in a lipoid. He states further that the process of assimilation of carbon dioxide goes on partly in a lipoid, partly in a hydroid phase. Surface active substances alter the bounding surfaces of both phases and thus hinder or stop assimilation.—*R. M. Holman.*

1004. WEBER, FRIEDL. **Notiz zur Kohlensäureassimilation von Neottia. [Carbonic acid assimilation by Neottia.]** Ber. Deutsch. Bot. Ges. 38: 233–242. 1920.—The author reviews the literature relating to the ability of the brown, also chlorophyll-containing, chromatophores in the cells of the inflorescence of the saprophytic orchid, *Neottia nidus avis*, to assimilate carbon dioxide. Interest in the question has been renewed since WILSCHKE's discovery that the green pigment in question contains only *a*-chlorophyll and none of the *b*-component of ordinary chlorophyll. The negative results of WILLSTÄTTER and STOLL are not considered conclusive by the author of the present paper.—The author found that the starch, which has long been known to be present in the cells of the brown inflorescence, does not disappear when the shoots are kept in the dark for many days; and that plants which have not been exposed to light at any time during their development, although strikingly etiolated and without either chlorophyll or the characteristic brown coloration, are nevertheless rich in starch. *Neottia* chromatophores are without that ability to reduce silver salts in darkness which MOLISCH found in the chloroplasts of all the phanerogams which he investigated, though weak in the case of green orchids and absent in certain diatoms and in *Hydrurus*. These 2 last mentioned groups, according to Wilschke, lack the chlorophyll component *b*. The author's attempts to determine by Engelmann's bacterial method whether oxygen was liberated by illuminated tissue containing chromatophores were not successful. Positive results were secured by the use of reduced indigo carmine solution, but the author believes the question not yet conclusively answered.—*R. M. Holman.*

1005. WILLSTÄTTER, RICHARD, UND ARTHUR STOLL. **Untersuchungen über die Assimilation der Kohlensäure. [Investigations of the assimilation of carbon dioxide.]** *448 p.* Julius Springer: Berlin, 1918.—A collection of seven papers: I. *The constant chlorophyll-content during photosynthesis.* The chlorophyll content of leaves is 0.15 - 0.35 gm. per 100 gm. fresh weight; 0.6 - 1.2 gm. per 100 gm. dry weight, and 0.3 - 0.7 gm. per sq. m. leaf surface. The carotinoids are 0.07 - 0.20 per cent of the dry weight, or 0.03 - 0.07 gm. per sq. m. Normal plants show a constant relation between the chlorophyll components a and b, designated

$Q\frac{a}{b}$ equal to an average of $2.9 \pm 0.5 - 0.6$. Under natural conditions this relation is not disturbed during photosynthesis. The relation of the 2 carotinoids, $Q\frac{c}{x} = 0.60 \pm 0.1$, also shows but slight variation during photosynthesis. Detailed directions are given for the analytical determination of the chlorophyll components. The quotient $\frac{\text{chlorophyll}}{\text{carotinoid}} = Q\frac{a+b}{c+x}$ varies greatly in different leaves and during the year. In autumn the chlorophyll components decrease while the carotinoids remain, $Q\frac{c}{x}$ varies irregularly, but $Q\frac{a}{b}$ remains about constant. After long continued photosynthesis, 22 – 67 hours, $Q\frac{a}{b}$ and $Q\frac{a+b}{c+x}$ were but very slightly changed, while $Q\frac{c}{x}$ was shifted in favor of the xanthophyll. An increase in the rate of respiration by raising the temperature to 30 – 37°C. had no effect on $Q\frac{a}{b}$ and $Q\frac{c}{x}$. Photosynthesis at 37 – 45°C. had no effect on the chlorophyll content, but $Q\frac{a}{b}$ was lowered. During very active photosynthesis, that is, at 30 – 32°C., 5 per cent CO_2, and light more intense than sunlight, after 6 hours no change in the chlorophyll content was observed.—II. *The relation between photosynthetic activity and the chlorophyll content of leaves.* The complex apparatus and methods used are described, based upon differential determination of CO_2 absorbed in KOH bulbs and weighed. Cut leaves were used and a metal filament electric lamp as the source of the light. "Assimilationszahl" is taken as a measure of photosynthesis and defined as grams of CO_2 fixed per hour per gram of chlorophyll. This varies with the species and with age of leaf used. For 1 molecule of chlorophyll old autumnal leaves of *Ampelopsis quinquefolia* fixed 18 molecules CO_2 and young autumnal leaves of the same plant 164 molecules; in the summer, leaves of *Sambucus nigra* fixed 135 molecules CO_2, *Sambucus nigra* var. *aurea* 2463; etiolated leaves of *Phaseolus vulgaris* fixed 2736 molecules CO_2. Experiments with leaves in early spring indicate that the development of pigments and of the photosynthetic machine are not parallel and it is concluded that photosynthesis is dependent not only upon chlorophyll but also upon an internal factor which precedes chlorophyll in the development of the leaf. When yellow autumnal leaves are brought under experimental conditions of maximal photosynthesis (25°C., 5 per cent CO_2, 48,000 M. C. S.) their activity on the basis of chlorophyll content is about the same as the normal leaf, for the activity of the internal factor has been reduced to about the same extent as the chlorophyll content. The "Assimilationszahl" of the skins of fruits is about the same as that of leaves. The absolute value of the photosynthetic rate is about the same for normal leaves and leaves of varieties poor in chlorophyll, and in the case of *Ulmus*, on the basis of leaf area, the leaves low in chlorophyll have the highest rates. With advancing season chlorophyll content increases while rate of photosynthesis decreases. In the yellow varieties the carotinoids are not higher in actual amount but only in proportion to the chlorophyll. That these yellow pigments play no direct rôle in photosynthesis is shown by the fact that when the violet rays, which are absorbed only by the carotinoids, are removed by means of a potassium bichromate filter, no reduction in the rate was observed. By filtering the light through 1 leaf of *Cucurbita pepo*, the photosynthetic rate of the same species was reduced to 1/20 of that without the filter, and filtered through 2 leaves the rate was zero. A comparative study of etiolated and normal leaves showed remarkably high photosynthesis rates for the former. Etiolated leaves exposed to the light 6–48 hours showed rates which in absolute values were higher than those of normal leaves. Etiolated leaves which had developed but 3–6 per cent of the normal chlorophyll content were able to fix completely their respiration CO_2. Chlorotic leaves exhibit a very weak photosynthetic activity. Anthocyanin seems to be without influence on photosynthesis. The parasite *Neottia nidus avis* was found to contain chlorophyll, but even at 30°C. and with 5 per cent CO_2 it carried on no photosynthesis. A comparative study, with leaves rich and poor in chlorophyll, of the effects of variations in temperature and light intensity revealed a decided disproportionality between chlorophyll content and photosynthetic

activity and led to the conclusion that in this process there are 2 variable factors: (a) the green pigment, and (b) a factor associated with the protoplasmic activity. The temperature coefficient depends upon the nature of the leaf and is probably variable for different species. Leaves poor in chlorophyll are more dependent upon variations in the light intensity while those rich in chlorophyll show greater variations with temperature.—III. *The absorption of carbon dioxide by the unilluminated leaf.* Leaves absorb CO_2 from a 10 per cent gas mixture. The absorption is independent of the pigment content. The leaf substance absorbs more CO_2 than the water in the leaf. The difference between the absorption by water and by the leaf substance is greater with decreasing partial pressure of CO_2. Leaves which have been killed and dried and then moistened again absorb CO_2 as do living leaves. The old statement that lecithin absorbs large quantities of CO_2 was found to be entirely erroneous.—IV. *The behavior of chlorophyll toward carbon dioxide.* Chlorophyll in organic solvents does not react with CO_2, but in colloidal aqueous solutions reaction takes place. CO_2 is absorbed and given off again when the partial pressure of the CO_2 is reduced. It is suggested that there is formed a combination of chlorophyll with performic acid or formaldehydperoxide which then splits off O_2. The absorption spectra of colloidal solutions of chlorophyll and of leaves are very similar. At 0°C. the addition of CO_2 to chlorophyll is most effective and decomposition into phaeophytin and $MgCO_3$ is lower. The aqueous colloidal solutions were allowed to absorb CO_2 and the amounts thus absorbed were determined by (a) passing CO_2-free air through the solution and determining the CO_2 liberated, (b) taking up in ether and determining the Mg content, (c) adding alcohol to make an 80 per cent solution and drawing off the gas. Each method shows that the CO_2 produces a certain amount of decomposition of chlorophyll. The decomposition of aqueous colloidal chlorophyll solutions can be greatly diminished by the addition of $MgCO_3$, and to a lesser degree by the addition of $CaCO_3$. These substances as well as gelatin also decrease the rate of addition of CO_2 to chlorophyll. Glycocoll, glucose, and starch exhibit no protective action.—V. *The constant photosynthetic coefficient during augmented photosynthesis.* The value of the photosynthetic coefficient, $\frac{CO_2}{O_2}$, for oxalic acid as the first reduction product = 4; for formic acid = 2; for glycollic acid = 1.33 for formaldehyde = 1. The difficulty of separating photosynthetic from respiratory activity has made accurate determination of the photosynthetic coefficient impossible. By sufficiently increasing photosynthetic activity, with high CO_2 content of air (5 per cent) and intense illumination, the inaccuracies incident to determining the respiratory activity become negligible in the determination of the photosynthetic coefficient. In experiments lasting 1–6 hours at 10–35°C. the coefficient was found to equal 1 constantly. In succulents, *Opuntia*, the coefficient equals 0.44 at first and after continued illumination reaches 0.85.—VI. *The dependence of photosynthesis upon small quantities of oxygen.* Removal of O_2 from the atmosphere greatly influences photosynthetic activity. Some species (*Pelargonium zonale*) lose the power to fix CO_2 when kept in an atmosphere of about 0.01 per cent O_2 and do not regain it in the presence of O_2. Other species, for example, *Cyclamen beropalum*, show slight photosynthesis in such an atmosphere, the rate increasing slowly with continued exposure. The longer the exposure to an O_2-free atmosphere, the lower is the photosynthesis and the more incomplete is the recovery of the leaf.—VII. *Investigations on the intermediate steps in photosynthesis.* This is a critical discussion of the experiments of others on the formation of CH_2O in the leaf and with chlorophyll preparations. Schryver's experiments were repeated with pure preparations of chlorophyll and no CH_2O was found. Colloidal chlorophyll solutions do not take up CH_2O. The experiments of Usher and Priestly and of Chodat and Schweitzer were repeated with pure colloidal chlorophyll preparations and with and without catalase; CH_2O was never found. Chlorophyll is relatively stable towards O_2 in the light; the first steps in photooxidation do not yield aldehydes nor lower peroxides. These latter substances found by other workers are products of the photooxidation of impurities accompanying the chlorophyll.—*H. A. Spoehr.*

METABOLISM (GENERAL)

1006. ANDERSON, R. J. **Acerin: the globulin of maple seed (Acer saccharinum).** Jour. Biol. Chem. 46^1: xxxvi. 1921.—The principal protein of the maple seed has been isolated and purified. The name acerin is proposed. It was not obtained in crystalline form, but separated on dialysis in small globular particles. Purified acerin is a nearly white, heavy powder which on combustion leaves no weighable ash.—*G. B. Rigg.*

1007. CLOWES, G. H. A., AND E. BACHMAN. **A volatile sperm-stimulating substance derived from marine eggs.** Jour. Biol. Chem. 46^1: xxxi. 1921.

1008. COLIN, M. H. **L'inuline chez les végétaux, genese et transformation. [Formation and transformation of inulin in plants.]** Rev. Gén. Bot. 31: 75–80, 179–195, 229–250, 277–286. 1919.—A method for the separation of inulin from the other carbohydrates is given. Inulin is formed by the condensation of sugars in the tissues of the root and stem, both glucose and fructose serving as materials for its formation, although hydrolysis yields, of course, only levulose. In the plants studied by the author, inulin appears in special members, as in the fleshy roots of dahlia, and in the subterranean stems of the tuberous sunflower. The tubercules of dahlia at the beginning of their development are rich in saccharose. In some of the plants studied inulin is replaced, at the time of rapid growth, by substances hydrolyzed with extract of yeast. In other cases saccharose appears in such quantities as cause the sap to become dextrorotary.—In the roots and tubercules of some of these plants is found an enzyme which is similar to sucrase of the yeast. It hydrolyzes not only saccharose, but also levulosans of low molecular weight.—*J. M. Brannon.*

1009. COOK, F. C. **Composition of tubers, skins and sprouts of three varieties of potatoes.** Jour. Agric. Res. 20: 623–635. 1921.—Chemical analyses are furnished of the 3 varieties Rural New Yorker, Green Mountain, and Irish Cobbler.—*D. Reddick.*

1010. ELLIS, N. R., H. STEENBOCK, AND E. B. HART. **Some observations on the stability of the antiscorbutic vitamine and its behavior to various treatments.** Jour. Biol. Chem. 46: 367–380. 1921.

1011. FELTON, L. D. **A colorimetric method for determining the hydrogen ion concentration of small amounts of fluid.** Jour. Biol. Chem. 46: 299–305. 1921.

1012. FREUDENBERG, KARL. **Neuere Ergebnisse auf dem Gebiete der Gerbstoff-Forschung. [Results of recent investigations on tannin.]** Naturwissenschaften 8: 903–907. 1920.—This is a presentation of the recent studies of FISCHER and others on the chemistry of the complicated group of tannic substances. The term tannin covers a large range of substances for which it is difficult to give any general characterization. Freudenberg classifies the tannins into 4 groups, (a) ester tannic substances, (b) catechin and its tannins, (c) tannins of the oak, and (d) ellagentannins.—*Orton L. Clark.*

1013. JORISSEN, A. **Recherches sur la cyanogenèse. Une réaction de l'acide citrique. [Investigations on cyanogenesis; a reaction of citric acid.]** Bull. Acad. Roy. Belgique, Cl. Sci. 1919: 731–737. 1919.—The author has recently shown that hydrocyanic acid is rapidly formed, in the cold, when very dilute aqueous solutions of citric acid are exposed to diffuse light in the presence of traces of iron compounds and of nitric acid. The reaction occurs under conditions comparable with those in the living cell.—He now gives further precise indications upon this topic of cyanogenesis and also indications concerning the identification of citric acid.—*Henri Micheels.*

1014. MENAUL, P. **Note on the formation of hydrocyanic acid in plants.** Jour. Biol. Chem. 46: 297. 1921.—Experimental results indicate that prussic acid may be formed in plants by the action of formaldehyde on nitrates.—*G. B. Rigg.*

1015. Nestler, A. **Zur Kenntnis des Rhinanthocyans.** [Rhinanthocyan.] Ber. Deutsch. Bot. Ges. 38: 117–121. 1920.—The author gives an account of various methods which he employed in extracting and splitting the glucoside, rhinanthin, which is responsible for the production of so-called blue bread from flour made from grain which contains seeds of *Alectorolophus hirsutus*, *Melampyrum arvense*, and other rhinanthin-containing seeds. In the author's experiments the glucoside was secured from the former of the 2 plants mentioned. The blue color of the alcohol-hydrochloric acid extract of the seeds, which is due to the splitting by the acid of the rhinanthin into rhinanthocyan and sugar, changes to orange red or red brown upon addition of potassium or sodium hydroxide. The blue color does not return after subsequent addition of acid. Hydrochloric acid splits the rhinanthin more effectively than sulphuric acid, and the decomposition is also brought about by oxalic, citric, lactic, and acetic acids. In the case of blue-bread production, lactic acid rather than acetic acid is responsible for the splitting, since the acetic acid is relatively weak in its ability to bring about the reaction. Good extraction media are 70 per cent alcohol plus 5 per cent hydrochloric acid, hot alcohol, and hydrochloric acid in distilled water. The colored solution of rhinanthocyan, however secured, undergoes alteration on standing. The color secured by extraction of the seeds with a medium containing acid, and also the green color of chloroform shaken with the colored extract, disappear when these liquids are passed through the ultrafilter of Wolfgang Ostwald.—*R. M. Holman.*

1016. Peterson, W. H., and Helen Churchill. **The carbohydrate content of the navy bean.** Jour. Amer. Chem. Soc. 43: 1180–1185. 1921.—The completeness of the digestion of the carbohydrates of legumes by malt diastase is enhanced by fine grinding. Such interfering substances as cellulose or protein are broken up and starch is exposed to the action of the enzyme. The authors found the iodine test extremely sensitive to small amounts of starch, but they also conclude that substances other than starch might give the iodine test.—*J. M. Brannon.*

1017. Peterson, W. H., E. B. Fred, and J. H. Verhulst. **The destruction of pentosans in the formation of silage.** Jour. Biol. Chem. 46: 329–338. 1921.—The corn fodder examined contained an average of 21.8 per cent of pentosans. During fermentation some of the pentosans were destroyed. Pentoses or other furfural-yielding substances, soluble in water, were present in the silage throughout the fermentation. The production of these substances is probably due to the action of microorganisms.—*G. B. Rigg.*

1018. Shaffer, P. A., and A. F. Hartmann. **The iodometric determination of copper and its use in sugar analysis. I. Equilibria in the reaction between copper sulphate and potassium iodide. II. Methods for the determination of reducing sugars in blood, urine, milk and other solutions.** Jour. Biol. Chem. 45: 349–364, 365–390. 1921.

1019. Shaw, R. H., and P. A. Wright. **A comparative study of the composition of the sunflower and corn plants at different stages of growth.** Jour. Agric. Res. 20: 787–792. 1921.—Chemical composition of sunflower (*Helianthus*) and corn (*Zea mays*) at the silage stage differs principally in the amount and character of the carbohydrates. Tables of analyses are given showing total protein, albuminoid protein, reducing sugars, non-reducing sugars, and starch at several different stages of development.—*D. Reddick.*

1020. Tottingham, W. E., R. H. Roberts, and S. Lepkovsky. **Hemicellulose of apple wood.** Jour. Biol. Chem. 45: 407–414. 1921.—Analysis of apple wood from fruiting branches shows a high content of the acid-hydrolyzable material commonly designated as hemicellulose. The alcohol-soluble fraction resulting from partial hydrolysis of this material has been found to contain large amounts of xylose and glucose, with a little galactose. It is suggested that this hydrolyzable material forms a reserve source of carbohydrate in the metabolism of the apple tree.—*G. B. Rigg.*

METABOLISM (NITROGEN RELATIONS)

1021. BEIJERINCK, M. W. **Chemosynthese bij denitrificatie met zwanel als energie. [Chemosynthesis and denitrification with sulphur as a source of energy.]** Verslag. K. Akad. Wetenschappen Amsterdam 29: 845–85€. 1920.

1022. BREWSTER, J. F. **The use of edestin in determining the proteolytic acitivity of pepsin.** Jour. Biol. Chem. 46: 119–127. 1921.—A method for the preparation of standard edestin from hemp seed is given, and also a method for the assay of pepsin based on the use of this standard preparation.—*G. B. Rigg.*

1023. COHN, E. J. **A physicochemical method of characterizing proteins. II.** Jour. Biol. Chem. 46[1]: iii-iv. 1921.—Glutenin and serum globulin are precipitated as undissociated molecules at their isoelectric point. Experimental evidence suggests that there is a physicochemical basis for our present classification of simple proteins.—*G. B. Rigg.*

1024. JOHNS, C. O., AND C. E. P. GERSDORFF. **The proteins of the tomato seed, Solanum esculentum.** Jour. Biol. Chem. 46[1]: xxvi. 1921.—A 4 per cent aqueous solution of sodium chloride extracts the maximum amount of protein. Two globulins, both high in sulphur, were found.—*G. B. Rigg.*

1025. JOHNS, C. O., AND H. C. WATERMAN. **Conphaseolin: a new globulin from the navy bean.** Jour. Biol. Chem. 46[1]: xliv. 1921.

1026. MILLER, HARRY G. **Distribution of nitrogen in the alfalfa seed.** Jour. Amer. Chem. Soc. 43: 906–914. 1921.

METABOLISM (ENZYMES, FERMENTATION)

1027. FRED, E. B., W. H. PETERSON, AND J. A. ANDERSON. **The relation of lactic acid bacteria to corn silage.** Jour. Biol. Chem. 46: 319–327. 1921.—Organisms of the *Lactobacillus pentoaceticus* type play an important part in the chemical changes produced. They are present throughout the fermentation, and in the last stages are the predominant type. Organisms of the *Bacillus lactis acidi* type persist and act only during the first days of the fermentation. The production of alcohol is undoubtedly due in part to the action of the pentose-fermenting type.—*G. B. Rigg.*

ORGANISM AS A WHOLE

1028. DALE, H. H. **The biological significance of anaphylaxis.** Proc. Roy. Soc. London B. 91: 126–147. 1920.

1029. FUNK, GEORG. **Ueber das Verhalten der Oscillatoria amphibia Ag. im Kolonie-Verband. [The behavior of Oscillatoria amphibia Ag. in colony-union.]** Ber. Deutsch. Bot. Ges. 38: 267–274. *Fig. 1.* 1920.—The author explains methods of obtaining relatively pure cultures of the organism for experimentation. He observes the movements due to causes residing within the organisms themselves when the cultures are placed, in varying quantities, in Petri dishes and in glass tubes filled, sealed, and laid horizontally. He also reports their behavior when stimulated by external agencies, for example, light, heat, and electricity. Further experimentation is in progress with a view to determining the causes of reactions.—*N. L. Gardner.*

1030. JOSHIA, N. V. **Studies on the root nodule organism of the leguminous plants.** Mem. Dept. Agric. India Bact. Ser. 1: 247–276. 1920.—The cross inoculation experiments made indicate that there is only a single species of the legume nodule organism, when nitrogen fixation and stimulation are taken as the criteria Where inoculation did not lead to nodule formation the plants were still found to derive benefit from the nitrogen fixed by the microorganism. The root-nodule organism was found to exert a beneficial influence on gramina-

ceous as well as leguminous plants. Benefit was derived by plants in a pot when the microorganism was grown in a porous cylinder placed in the center of the pot. Inoculation with *Azotobacter* gives similar results to those obtained with the nodule organism when the latter does not bring about nodule formation.—*J. J. Skinner.*

1031. MACDONALD, MARGARET, AND E. V. MCCOLLUM. **The cultivation of yeast in solutions of purified nutrients.** Jour. Biol. Chem. 45: 307–311. 1921.—Experiments indicate that yeast either grows in the absence of any special growth-promoting substance or that it synthesizes the substance to meet its own needs.—*G. B. Rigg.*

1032. NELSON, V. E., E. I. FULMER, AND RUTH CESSNA. **The nutritional requirements of yeast. III. The synthesis of water-soluble B by yeast.** Jour. Biol. Chem. 46: 77–81. 1921. —Yeast can synthesize water-soluble B.—*G. B. Rigg.*

1033. PEARL, RAYMOND. **The biology of death. II. Conditions of cellular immortality.** Sci. Monthly 12: 321–335. *Fig. 1–6.* 1921.—The work of JACQUES LOEB on artificial parthenogenesis, FRANK R. LILLIE'S work on fertilization, LEO LOEB'S successful cultures of somatic cells and tissues outside of the body, HARRISON and BURROW'S improved technique in this same field, and CARREL'S work with adult tissue of mammals, actual growth and development of new cells and new individuals in vitro secured by H. V. WILSON, Dr. and Mrs. W. H. LEWIS'S discovery that growth takes place in tissues outside of the body in inorganic solutions, Carrel's success in keeping cells alive longer than the normal life of these (with the promise of indefinite continuation of the same),—these all lead to the conclusion that the essential tissues of the metazoan body are potentially immortal. Senescence is to be regarded as an attribute of the multicellular body as a whole and not a primary attribute of the physiological economy of cells as such. It shows that purely cytological methods are not suitable for investigating causes of senescence.—*L. Pace.*

1034. PEARL, RAYMOND. **The biology of death.** Sci. Monthly 12: 444–447. 1921.—This article continues the discussion of this subject, giving tables showing chances of life or death of different periods, and ages of the individual, with an analysis of these data.—*L. Pace.*

1035. WILLIAMS, R. J. **Vitamines and yeast growth.** Jour. Biol. Chem. 46: 113–118. 1921.—Bakers' yeast and brewers' yeast were used. The growth of each is stimulated more by its own extract than by that of the other. This is interpreted to mean that there is some specificity in growth stimulants, but not necessarily 2 totally different substances stimulating the growth of the 2 varieties. Some results present the possibility that the antiscorbutic vitamine, as a secondary factor, may stimulate yeast growth.—*G. B. Rigg.*

GROWTH, DEVELOPMENT, REPRODUCTION

1036. BRANNON, J. M. **A simple method for growing plants.** Amer. Jour. Bot. 8: 176–178. *Fig. 1.* 1921.—The author has grown plants successfully when completely immersed in sterilized and sealed culture solutions containing sugar and mineral salts. Flax, alfalfa, corn, peas, and timothy may be readily grown in this way and thrive better than in agar or in the ordinary water culture. The author points out the particular advantage of this method when plants are to be grown in the dark.—*E. W. Sinnott.*

1037. HARRIS, J. A., AND H. S. REED. **Inter-periodic correlation in the analysis of growth.** Biol. Bull. [Woods Hole] 40: 243–258. *2 fig.* 1921.—From a series of data collected by one of the authors the attempt is made to illustrate the application of inter-periodic correlation coefficients to the problem of growth. In the discussion the following terms are used and defined. Growth stage is the time at which a series of organisms is measured. Growth period is the time elapsing between the sth and the $s+n$th growth stage, and the growth increment is the increase in size during such period. The relative growth increment

is the ratio of the growth increment to the absolute size of the individual at a given stage. Three problems were under consideration, namely: (1) The correlation between the absolute size of an organism at its several periods of development; (2) the correlation between the growth increments of the organism during the several growth periods; (3) the correlation between the absolute size of the organism at given stages of development and subsequent growth increments. A discussion of each problem follows. *Helianthus* plants were used for study. The general results show that the actual size of an individual at any stage of development is closely correlated with its size at other closely correlated stages of development but rapidly diminishes as the growth stages become widely separated. Also the ultimate size of an organism is only slightly determined by its initial size. The correlation between successive growth increments is positive in sign and has the general average of .501. The correlation for increments of weekly periods separated by an interval of 1 week is about .225. The correlation between growth increments more widely separated is on the average negative in sign. Plants which grow rapidly during a certain stage of development will grow more rapidly during a closely associated period, but widely separated periods have little or no relationship between the growth increments. The growth increment is positively correlated with its size at an immediately preceding stage. In the early stages the growth increments of 2 or 3 subsequent periods during the early stages of growth are positively correlated with the initial size of the organism.—*T. J. Fitzpatrick.*

1038. REED, HOWARD S. **Growth and sap concentration.** Jour. Agric. Res. 21: 81–98. *7 fig.* 1921.—Material for the investigation consisted of walnut (*Juglans*) and apr cot (*Prunus armeniaca*) trees, both in their 2nd year of growth, and of new shoots of orange (*Citrus*).—The 2 variables, growth and concentration of sap, vary in opposite directions. As the season advances the concentration of sap increases and, in apricot, continues to increase after active growth ceases. This is largely a matter of the accumulation of solutes, although diminished absorption of water may be responsible in part. Addition of water to the soil usually results in a diminution of sap concentration. This is the only one of the external factors considered that seems to affect concentration. Sap concentration of shoots on heavily pruned trees is lower than that of shoots from unpruned trees. A concentration gradient exists in the shoots, the concentration of sap at the tips being greater than at the base of shoots. Low concentrations of sap in the shoot as a whole appear o be associated with abundant water intake and rapid vegetative growth, while higher concentrations are associated with slow growth and fruit-bud formation. Summer pruning of fruit trees is not only unnecessary but may be detrimental.—*D. Reddick.*

1039. SCHÜEPP, OTTO. **Über Form und Darstellung der Wachstumskurven. [The form and representation of growth curves.]** Ber. Deutsch. Bot. Ges. 38: 193–199. 1920.

MOVEMENTS OF GROWTH AND TURGOR CHANGES

1040. OEHLKERS, FRIEDRICH. **Zur reizphysiologischen Analyse der post-floralen Krümmungen des Blütenstiels von Tropaeolum majus. [An analysis of the post-floral curvatures of the peduncle of Tropaeolum majus.]** Ber. Deutsch. Bot. Ges. 38: 79–83. 1920.—This is a preliminary report. The curvatures in question begin about 12 hours after the pollination of the protandrous flowers. First, the apical zone of the peduncle, beginning just below the ovary, bends through about 90°. The second curvature, in a 3–5 cm. zone, below the region of the first curvature, occurs within the next 24 hours; and this curvature may amount to as much as 270°, generally lessened somewhat by a slight counter reaction. Finally, about the time of the ripening of the seeds, a short zone at the base and in the axil of the subtending leaf curves in the same direction as the above. By experiments with peduncles detached from the plant and subjected to unilateral illumination, by rotation upon the clinostat, and by retention in the dark room, the author has attempted to find an explanation for the first 2 curvatures and for the variations which sometimes occur in the reactions of plants growing outdoors. His principal conclusions are that the post-floral curvatures represent a combined sensitive reaction which can be accounted for only on the basis of a change of

tonus, which does not depend on the fertilization of the flower. Fertilization is related to the reaction only in that it induces renewed growth. The reactions are geotropically positive and phototropically negative, they are dorsiventral, and dissimilar curvatures result from the stimulus of gravity or light alone. The normal curvature is the resultant of the geotropic and the phototropic reactions. The striking over-curvature is due to the fact that the post-floral growth progresses from the free end to the fixed base and the curvature does not displace the zone which is still capable of growth and reaction from the position of stimulation. The counter reaction is slight because the growth period is short and the reaction time very long.—*R. M. Holman.*

1041. ZOLLIKOFER, CLARA. **Ueber die tropistische Wirkung von rotem Licht auf Dunkelpflanzen von Avena sativa. [Tropic action of red light on etiolated plants of Avena sativa.]** Verslag. K. Akad. Wetenschappen Amsterdam 29: 551–558. *1 fig.* 1920.—Experiments were conducted in a darkroom under the influence of a 100 candle-power light, surrounded by very dark ruby glass which was spectroscopically tested, the room having a constant temperature of 22.5°C. and a moisture content of 55 to 60 per cent. All reactions showed a remarkable uniformity at any definite light intensity. The lowest light intensity at which any observable phototropic action occurred was between 15 and 30 M. C. S.—*J. C. Th. Uphof.*

RADIANT ENERGY RELATIONS

1042. DISHOEK, A. F. C. VAN. **Gevoeligheid voor licht van + en − stammen van Phycomyces nitens. [Light sensitiveness of "plus" and "minus" strains of Phycomyces nitens.]** Verslag. K. Akad. Wetenschappen Amsterdam 29: 667–669. 1920.—In phototropic experiments with *Phycomyces nitens* the various strains do not give the same results. With one-sided illumination the sporophores of the minus strains were strongly directed toward the light, the plus strain slightly. Other observations as to light sensitiveness are given.—*J. C. Th. Uphof.*

1043. MEYER, FRITZ J. **Die Licht Physiologie der Pflanzen. [The light physiology of plants.]** Naturwissenschaften 8: 842–851. *5 fig.* 1920.—This is a critical presentation of the results of important papers of recent years dealing with (a) light and germination, (b) light and growth, (c) light and assimilation, (d) the lethal effect of ultraviolet rays, and (e) light and plant movements.—*O. L. Clark.*

TOXIC AGENTS

1044. ATWOOD, W. M. **Physiological studies of the effects of formaldehyde on wheat. [Abstract.]** Phytopathology 11: 103. 1921.

1045. SEELIGER, RUD. **Über einige physiologische Wirkungen des Osmium tetroxyds. [Some physiological effects of osmium tetroxide.]** Ber. Deutsch. Bot. Ges. 38: 176–184. 1920.—Grains of wheat kept for 8 hours in $\frac{1}{10}$ to $\frac{1}{2}$ per cent solutions of osmium tetroxide subsequently showed 100 per cent germination. Some germinated even after similar treatment with 1 per cent solution. The harmful effect of the tetroxide was evident in the slower germination of the wheat, in the slower growth of the seedlings, and in a permanent dwarfing of the plants.—*R. M. Holman.*

SOIL SCIENCE

J. J. SKINNER, *Editor*

F. M. SCHERTZ, *Assistant Editor*

(See also in this issue Entries 585, 588, 589, 590, 595, 596, 604, 605, 606, 616, 620, 638, 682, 790, 820, 1030)

GENERAL

1046. BOUYOUCOS, GEORGE. **The amount of unfree water in soils at different moisture contents.** Soil Sci. 11: 255–259. 1921.—By the use of the dilatometer the amount of unfree

water in 12 soils at 5 or 6 different water contents was determined. The amount of unfree water in a given soil does not vary with the water content but appears to remain constant.—*W. J. Robbins.*

1047. Gardner, Willard, and John H. Widtsoe. **The movement of soil moisture.** Soil Sci. 11: 215–232. *11 fig.* 1921.—A mathematical discussion of the movement of water through soil.—*W. J. Robbins.*

1048. Guthrie, F. B., A. A. Ramsey, R. M. Petrie, and F. J. Stokes. **List of fertilizers in New South Wales.** Agric. Gaz. New South Wales 32: 277–284. 1921.—A list is given showing the composition of fertilisers on the market.—*L. R. Waldron.*

1049. Howard, Albert. **Investigaciones recentes sobre o arejamento dos solos.** [Recent investigations on the aeration of soils.] Bol. Agric. [Nova Goa, Portuguese East India] 1: 254–264. 1919.—Translation of a paper given before the Indian Congress of Science, 1919.—*John A. Stevenson.*

1050. Juritz, Chas. F. **Calcium cyanamide. Its agricultural use as a fertilizer.** Jour. Dept. Agric. Union of South Africa 1: 765–769. 1920.—A discussion of calcium cyanamide is presented, including manufacture and agricultural uses. A review of the literature showing its comparative value and cautions to be observed in its use is given.—*Lyman Carrier.*

1051. Juritz, Chas. F. **Wheat straw and its value to the land.** Jour. Dept. Agric. Union of South Africa 1: 712–717. 1920.—The disposal of wheat straw in the various districts of the South African Union is discussed. The value of the material as a fertilizer is discussed, and chemical analyses are given. The utilization of all wheat straw as fertiliser is recommended, by applying either directly to the soil or indirectly by feeding to animals, or using as a litter and then applying the manure to the land.—*Lyman Carrier.*

1052. Kazakov, A. **Znachenie Viatskikh fosforitnykh zalezhei v dele podniatiia zemledeliia v Rossii.** [Importance of the Viatka phosphate deposits.] Narodnoe Khoziaistvo [Moscow] 1920: 66–68. 1920.—A systematic survey of the last 2 years has shown that the Viatka phosphate deposits, from a commercial point of view, are superior even to the world-famous South Carolina deposits. While being equal to the latter in its quality and in conditions of exploitation, the Viatka or Kama layer is twice as thick as the Carolina layer. There are enormous quantities of cheap fuel (wood) in the vicinity and it is the only deposit in European Russia that permits exploitation by the open method with an extensive application of powerful machinery.—*M. Shapovalov.*

1053. Keen, B. A. **The physical investigation of soil.** Sci. Prog. [London] 15: 574–589. 1921.—A general review of the subject of soil physics together with its relation to agriculture is given under the following heads: (1) The dimensions of the individual particles and the manner of their arrangement, (2) soil moisture, (3) soil temperature, and (4) soil atmosphere.—*J. L. Weimer.*

1054. Lipman, C. B. **Report on soils.** Jour. Assoc. Official Agric. Chem. 4: 388–389. 1921.—A report is presented of progress in determining phosphorus in soils.—*F. M. Schertz.*

1055. McCall, A. G. **The effect of manure-sulphur composts upon the solubility of the potassium of greensand.** Jour. Assoc. Official Agric. Chem. 4: 375–376. 1921.—The potassium of greensand was made water soluble through sulphofication, the most effective compost containing sulphur and manure in equal amounts. When part of the manure was replaced by soil, sulphofication was reduced and consequently less potash was rendered water-soluble; while if all of the manure was replaced by soil only a very small amount of potash was found in the water extract. A greater total amount of water-soluble potash was recovered in the composts containing high-potassium greensand, but a greater percentage of total potassium

was liberated from the low-potassium greensand. In composts containing manure the total amounts of potash recovered in the water extracts varied from 9.1 to a maximum of 41.3 per cent of the total initial amount present.—*F. M. Schertz.*

1056. McCool, M. M., and L. C. Whiting. **Some studies on the rate of formation of soluble substances in several organic soils.** Soil Sci. 11: 233–247. *4 fig.* 1921.—By means of the freezing point method the rate of formation of soluble material was determined in 7 organic soils under different moisture and temperature conditions and at different depths. At any given moisture content, higher temperatures tend to bring more material into solution and lower temperatures decrease the rate of formation. In general, the ability to yield soluble materials decreased regularly from the surface to the water-table. The zone of weathering and the region of greatest activity closely coincide.—*W. J. Robbins.*

1057. MacIntire, W. H., and C. A. Mooers. **A pitless lysimeter equipment.** Soil Sci. 11: 207–213. *Pl. 1–2, fig. 1.* 1921.—A lysimeter system not requiring a concrete enclosure and costing $500 for a 12-unit system is figured and described. It consists essentially of a pair of cylindrical iron tanks, the inner of which holds the soil. Arrangements are made for removing the leachings from the outer tank by means of a pump.—*W. J. Robbins.*

1058. MacIntire, W. H., F. J. Gray, and W. M. Shaw. **The non-biological oxidation of elemental sulphur in quartz media.** Soil Sci. 11: 249–259. 1921.—Elemental sulphur will oxidize upon moist contact with relatively pure quartz under both aerobic and CO_2 anaerobic conditions. Metallic iron depresses the oxidation, limonite accelerates it. Several carbonates under aerobic conditions increase the oxidation. Elemental sulphur may be oxidized to sulphates in a silicious medium solely by chemical reactions.—*W. J. Robbins.*

1059. Peterson, Alvah. **Some soil fumigation experiments with paradichlorobenzene for the control of the peach tree borer, Sanninoidea exitosa Say.** Soil Sci. 11: 305–319. *Pl. 1, 1 fig.* 1921.—If the soil temperature is 55–60°F. and the soil not too wet, ¾ to 1 oz. of paradichlorobenzene will kill 90–100 per cent of the peach-tree borers. It can be safely applied to trees 6 years of age or older. It should be placed in a narrow band about the base of the tree approximately 2 inches from the trunk. The material should be covered with several shovels of soil.—*W. J. Robbins.*

1060. Rost, Clayton O., and Frederick J. Alway. **Minnesota glacial soil studies I. A comparison of soils on the late Wisconsin and Iowan drifts.** Soil Sci. 11: 161–205. *Pl. 1–3, 7 fig.* 1921.—A comparison was made of the physical and chemical composition of 3 soil types occurring on 2 adjacent drifts of similar original till but of different geologic age. No distinct differences between the 2 drifts were found in texture, or content of silicon, aluminum, potassium, sodium, magnesium, non-carbonate lime, nitrogen, or organic carbon. The soils on the older drift are considerably richer in phosphoric acid and contain appreciably more iron and titanium. It would appear that the only distinct influence which the greater age of the Iowan drift has been able to exert upon the soils developed upon it is confined to the leaching out of carbonates to a greater depth and an enrichment of the surface layers in phosphoric acid.—*W. J. Robbins.*

1061. Stewart, Guy R. **The effect of continuous cropping upon the major soil nutrients.** Soil Sci. 11: 321–323. 1921.—Two sets of soils in containers holding 1800 lbs., 1 set very similar and consisting of 6 clay loams, the other dissimilar and consisting of 7 fine sandy loams, have been cropped continuously for 6 seasons. The average decrease in crop yield amounts to 35.2 per cent for the straw and 34.4 per cent for the grain. In 5 of the 7 sandy loams there has been a reduction of 30 per cent or more of the soluble phosphates while only 2 of the clay loams have begun to show a decrease. Determinations before the soils were planted showed that the fine sandy loams contained 0.05–0.09 per cent, the silty clay 0.13–0.18 per cent of total nitrogen. At the close of 1919 all the soils, both planted and fallow, showed a reduction of 14–38 per cent of their original total nitrogen content.—*W. J. Robbins.*

1062. WYANT, ZAE NORTHRUP. **A comparison of the technic recommended by various authors for quantitative bacteriological analysis of soil.** Soil Sci. 11: 295–303 1921.—A study of the literature and analysis of the methods found there for the quantitative bacteriological analysis of soil are presented.—*W. J. Robbins.*

LIME STUDIES

1063. HARTWELL, BURT L. **Need for lime as indicated by relative toxicity of acid soil conditions to different crops.** Jour. Amer. Soc. Agron. 13: 108–112. 1921.—The kind of plant to be grown determines, more than any other factor, the amount of lime to apply to the soil.—*F. M. Schertz.*

1064. MACINTIRE, W. H. **Report on the lime absorption coefficient of soils.** Jour. Assoc. Official Agric. Chem. 4: 389–390. 1921.—The author recommends the Jones method, as follows: To 5.6 gm. of soil add 0.5 gm. of calcium acetate (tested reagent), place in a mortar and mix; add water to make a fairly stiff paste. Pestle for 20 seconds, add 30 cc. of water, and continue the mixing for 30 seconds. Wash into a 200 cc. flask and keep the bulk down to about 160 cc. Let stand, with occasional shaking, for 15 minutes. Make up to a bulk of 200 cc., mix, and filter through a dry filter. Discard the first 10–15 cc., which may be cloudy; a Büchner funnel is recommended for filtering. Titrate 100 cc. of the clear filtrate, using phenolphthalein as an indicator, with N/10 NaOH. This reading multiplied by 2 gives the number of cc. of N/10 alkali required to neutralize the acetic acid in 200 cc. of the solution. This figure times the factor 1.8 times 1000 indicates the pounds of CaO required per 2,000,000 pounds of soil.—*F. M. Schertz.*

1065. PIPER, C. V. **The symposium on liming.** Jour. Amer. Soc. Agron. 13: 89–90. 1921.—A brief synopsis of definitely known facts and the more or less controversial problems in regard to the agricultural use of lime.—*F. M. Schertz.*

1066. SCHOLLENBERGER, C. J. **Lime requirements and reaction of lime materials with soil.** Soil Sci. 11: 261–276. 1921.—Various lime materials were mixed with soil in undrained pots and at intervals the residual carbonate, accumulated nitrate, and lime requirement were determined. Caustic lime was most reactive followed by precipitated calcium carbonate and "dicalcium silicate"; high-calcium limestone, calcite, and magnesite; natural carbonate dolomite; and blast furnace slag. The interaction of soil constituents and calcium carbonate is sufficiently regular and quantitative to show the lime requirement based upon the reaction. The preparation of the sample, temperature, and time allowed for the determination are of considerable importance. Heating is not undesirable in a perfect lime-requirement test.—*W. J. Robbins.*

1067. WORTH, F. G., AND PO SAW MAUNG. **Absorption of lime by soils.** Mem. Dept. Agric. India Chem. Ser. 5: 157–171. 1919.—The lime-absorbing power of a number of local soils was studied by the addition of a measured amount of calcium bicarbonate to a weighed amount of soil, the mixture digested for 6 hours, then filtered and titrated. A theoretical discussion of the results is given.—*J. J. Skinner.*

PEAT

1068. AIYER, P. A. SUBRAMANIA. **The gasses of swamp rice soils. Part V. A methane-oxidizing bacterium from rice soils.** Mem. Dept. Agric. India Chem. Ser. 5: 173–180. 1920.—The oxidation of methane in paddy rice soils is caused by the bacterium *B. fluorescens liquefaciens.* Organic matter interferes with the bacterium; the oxidation proceeds in purely mineral media.—*J. J. Skinner.*

1069. ALWAY, F. J. **Experimental work on Minnesota peat soils.** Jour. Amer. Peat Soc. 14: 40–47. 1921.

1070. BEATTIE, J. H. **Truck growing on muck in the Kankakee marsh of northern Indiana.** Jour. Amer. Peat Soc. 14: 32–39. 1921.—Onions, cabbage, and celery were grown. Applica-

tions of nitrate of soda, tankage, acid phosphate, and lime had very little effect. The application of potash salts, particularly muriate, and manure gave marked increases.—*G. B. Rigg.*

1071. BOTTOMLEY, W. B. **Treatment of peat.** Jour. Amer. Peat Soc. 14: 56. 1921.—Canadian patent 206,416 covers a method of producing auxinomes (growth-promoting substances) in peat.—*G. B. Rigg.*

1072. HARRISON, W. H. **The gases of swamp rice soils, part VI. Carbon dioxide and hydrogen in relation to rice soils.** Mem. Dept. Agric. India Chem. Ser. 5: 181–194. 1920.—Carbon dioxide and H do not exist in association in paddy rice soils. Carbon dioxide is apparently reduced by H as fast as it is formed, resulting in the formation of marsh gas and organic matter. This reaction is said to be an important factor in the conservation of the oxygen, which remains available for root aeration.—*J. J. Skinner.*

TAXONOMY OF VASCULAR PLANTS

J. M. GREENMAN, *Editor*

E. B. PAYSON, *Assistant Editor*

(See also in this issue Entries 848, 874, 984)

GENERAL

1073. BRITTON, N. L. **Investigations of the flora of northern South America.** Science 53: 29. 1921.—In 1918 a cooperative effort was made by the New York Botanical Garden, the United States National Museum, and the Gray Herbarium to investigate the botany and plant products of northern South America. The investigation has made good progress through the study of specimens already obtained in Dutch and British Guiana, Trinidad, Tobago, Venezuela, Curaçao, Colombia, and Ecuador. This undertaking has been furthered by the heartiest cooperation on the part of leading men in the countries concerned. A wealth of material hitherto unknown to science has already been identified, and many facts are being added to our knowledge of the flora and its geographic distribution.— *A. H. Chivers.*

1074. HU, HSIEN SU. **The botanical names of Chekiang plants.]** Ko-Hsueh [Science-Publ. Chinese Sci. Soc.] 6: 70–101. 1921.—A list of botanical names for 302 species of vascular plants collected in the province of Chekiang is presented with the equivalent Chinese names in characters. The name of the locality where each plant was collected is also indicated in the list.—*Chunjen C. Chen.*

1075. NAKAI, TAKENOSHIN. **Notulae ad Plantas Japoniae et Koreae, XXIII.** [Notes on the plants of Japan and Korea XXIII.] Bot. Mag. Tôkyô 34: 141–158. 1920.—Two new genera, **Crepidiastrum** (Compositae) and **Paraixeris** (Compositae), and the following new species, varieties, and combinations are made: *Dryopteris oligophlebia* var. *lasiocarpa* (Hayata) and *D. purpurascens* (Blume), *Eria bidentata, Eulophia Toyoshimae, Stachyurus Matsuzakii, Stellera rosea, Crepidiastrum ameristophyllum* (Nakai), *C. grandicollum* (Koidzumi), *C. Keiskeanum* (Maximowicz), *C. koshunense* (Hayata), *C. lanceolatum* (Houttuyn), *C. lanceolatum* forma *typicum* (Makino), *C. lanceolatum* var. *latifolium* (Nakai), *C. linguaefolium* (A. Gray), *C. Quercus* (Léveillé & Vaniot), *C. taiwanianum* (Nakai), *Ixeris longirostra* (Hayata), *I. Matsumurae* (Makino), *I. microcephala* (Nakai), *I. nipponica* (Nakai), *I sonchifolia* (Bunge), *I. sororia* (Miquel), *Paraixeris chelidoniifolia* (Makino), *P. denticulata* (Houttuyn), *P. denticulata* forma *typica* (Maximowicz), *P. denticulata* forma *pinnatipartita* (Makino), *P. denticulato-platyphylla* (Makino), *P. Yoshinoi* (Nakai).—*Roxana Stinchfield Ferris.*

1076. PENNELL, FRANCIS W. **"Unrecorded" genera of Rafinesque—I. Autikon Botanikon (1840).** Bull. Torrey Bot. Club 48: 89–96. 1921.—Certain of the papers by Rafinesque were not seen by the bibliographers who compiled the Index Kewensis; for example, his papers

in the American Monthly Magazine and his Autikon Botanikon. A list is here given of some 83 new genera published in the Autikon, naming the type species and the affinities of each genus.—*P. A. Munz.*

1077. PORSILD, MORTEN P. **The structure and biology of arctic flowering plants. 14. Liliales.** Meddel. om Grönland 37: 345–357. *Fig. 1–8.* 1920.—Notes are given concerning the distribution of several liliaceous arctic plants. Three species of *Tofieldia* are treated in detail with remarks on anatomy, morphology, and ecology.—*E. B. Payson.*

1078. R., A. B. **The Cambridge British Flora.** [Rev. of: Moss, C. E. **The Cambridge British Flora.** Vol. iii. **Portulacaceae to Fumariaceae.** *xvi + 200 p., vi + 191 pl.* University Press: Cambridge, 1920.] Nature 106: 337–338. 1920.—Since the previous volume, the editor has left England and the artist has died. Increased cost of production has necessitated raising the price to nearly 3 times that of the original. Notes by Moss on arrangement, limitations of families, etc., are of considerable interest, though sometimes difficult of appreciation by the ordinary student, who may consider the elevation of *Actaea* and *Paeonia* to the rank of families as puzzling and unnecessary. [See also Bot. Absts. 8, Entry 2232.]—*O. A. Stevens.*

1079. SALISBURY, E. J. [Rev. of: BEWS, J. W. **The grasses and grasslands of South Africa.** *iv + 161 p., 24 fig., 1 map.* P. Davis & Sons, Ltd.: Pietermaritzburg, 1918. Sci. Prog. [London] 13: 675–676. 1919.

1080. SARGEAUNT, JOHN. **The trees, shrubs, and plants of Virgil.** *Small 8vo., vii + 149 p.* B. H. Blackwell: Oxford, 1920.—The author has commented on the numerous plants to which reference is made in the works of Virgil and associated with them present day scientific botanical names.—*J. M. Greenman.*

SPERMATOPHYTES

1081. ANONYMOUS. **Novitates africanae.** Ann. Bolus Herb. 3: 1–14. *Pl. 1–2.* 1920.—This article contains descriptions of new species by various authors. The following is a list of species described: *Diosma Marlothii* Dummer, *Barosma Bathii* Dummer, *Lebeckia elongata* Hutchinson, *Dolichos Pearsonii* Hutchinson, *Caesalpinia Pearsonii* L. Bolus, *Mesembrianthemum caespitosum* L. Bolus, *M. Strubeniae* L. Bolus, *M. purpureostylus* L. Bolus, *Geigeria pilifera* Hutchinson, *Helichrysum viscidissimum* Hutchinson, *Plumbago Pearsonii* L. Bolus, *Solanum rigescentoides* Hutchinson, *Clerodendron Teaguei* Hutchinson, *Homeria tilacina* L. Bolus, *H. bifida* L. Bolus, *H. speciosa* L. Bolus, *Watsonia Galpinii* L. Bolus, *Antholyza Watsonius* (Thunb.) L. Bolus, *A. Guthriei* L. Bolus, *A. Sladeniana* Pole-Evans, *Apicra rubiflora* L. Bolus, and *Agapanthus Walshii* L. Bolus.—*E. P. Phillips.*

1082. ARTHUR, J. C. **New combinations for phanerogamic names.** Torreya 21: 11–12. 1921.—Nine new combinations are proposed for names of plants cited as hosts for various species of Uredinales, viz.: *Cnidoscolus urens* (L.) and *Adenoropium angustifolium* (Griseb.), both transferred from *Jatropha*; *Vincetoxicum bifidum* (Hemsl.), *V. erianthum* (Decaisne) and *V. uniflorum* (HBK.), from *Gonolobus; Sphaeralcea arcuata* (Greene) from *Malvastrum*; *S. fasciculata* (Nutt.) from *Malva*; *Madronella viridis* (Jepson) from *Monardella*; *Coleosanthus megalodontus* (Greenm.) from *Brickellia.*—*J. C. Nelson.*

1083. BLAKE, S. F. **Neomillspaughia, a new genus of Polygonaceae, with remarks on related genera.** Bull. Torrey Bot. Club 48: 77–88. *Pl. 1.* 1921.—A key is given to the following genera: *Brunnichia, Antigonon, Gymnopodium,* Neomillspaughia gen. nov., and *Podopterus. Gymnopodium antigonoides* (Robinson) Blake and *G. ovatifolium* (Robinson) Blake, *Neomillspaughia paniculata* (Donn. Sm.) Blake, and *N. emarginata* (H. Gross) Blake are given as new combinations, and *Podopterus guatemalensis* Blake is described as a new species.—*P. A. Munz.*

1084. BOLUS, L. **Notes on Compositae.** Jour. Bot. Soc. South Africa 6: 9–11. 1920.

1085. BRITTON, NATHANIEL LORD. **Descriptions of Cuban plants new to science.** Mem. Torrey Bot. Club 16: 57–118. 1920.—New genera and species of flowering plants of Cuba are here published by the author and cooperating specialists. Unless otherwise indicated Dr. Britton is the author of the new names enumerated in the following list: *Paspalum Rocanum* Fr. Léon, *P. Edmondi* Fr. Léon, *P. acutifolium* Fr. Léon, *Cyperus camagueyensis, C. Underwoodii, Eleocharis Shaferi, E. minutissima, Fimbristylis ophiticola, Hymenocallis praticola* Britton & Wilson, *Vanilla savannarum, Peperomia similis, P. cueroensis, P. sumideroensis, P. carnosa, P. sevillensis, P. trinitensis, P. neglecta, P. siguaneana, P. Clementis, P. bullata, Portulaca cubensis* Britton & Wilson, *Hyperbaena acutifola, H. littoralis, Xylopia Roigii* P. Wilson, *Persea Shaferi* P. Wilson, *Cassia benitoensis* Britton & Wilson, *Caesalpinia subglauca, C. myabensis, C. Hornei, Harpalyce macrocarpa* Britton & Wilson, *H. villosa* Britton & Wilson, **Bembicidium** Rydberg n. gen. of Leguminosae, *B. cubense* Rydberg, *Notodon cayensis* Britton & Wilson, *N. savannarum* Britton & Wilson, **Cañizaresia** n. gen. of Leguminosae, *C. cubensis* (*Piscidia cubensis* Urban), *Bradburya lobata* Britton & Wilson, *Erythrina venosa* Britton & Wilson, *Phaseolus savannarum* Britton & Wilson, *Erythroxylon Roigii* Britton & Wilson, *E. coriaceum* Britton & Wilson, *Elaphrium Shaferi* Britton & Wilson, *Bunchosia Leonis* Britton & Wilson, *Andrachne cuneifolia,* **Ramsdenia** n. gen. of Euphorbiaceae, *R. excisa* (*Phyllanthus excisus* Urban), *R. incrustata* (*Phyllanthus incrustatus* Urban), *Orbicularia scopulorum, O. foveolata,* **Roigia** n. gen. of Euphorbiaceae, *R. comosa* (*Phyllanthus comosus* Urban), *Conami ovalifolia,* **Dimorphocladium** n. gen. of Euphorbiaceae, *D. formosum* (*Phyllanthus formosus* Urban), *Phyllanthus Selbyi* Britton & Wilson, *P. dimorphus* Britton & Wilson, *Croton cueroensis* Britton & Wilson, *Argythamnia cubensis* Britton & Wilson, *Lasiocroton gracilis* Britton & Wilson, *L. cordifolius* Britton & Wilson, *Pera longipes* Britton & Wilson, *P. pallidifolia* Britton & Wilson, *Sapium cubense* Britton & Wilson, *Acalypha Hutchinsonii, Cyrilla cubensis* P. Wilson, *Ilex Shaferi* Britton & Wilson, *I. Clementis* Britton & Wilson, *Salacia nipensis, Sarcomphalus cubensis, Rhamnidium oblongifolium* Britton & Wilson, *R. orbiculatum* Britton & Wilson, *R. Rocanum* Britton & Wilson, *Cissus Torreana* Britton & Wilson, *Malache calcicola, Maga cubensis* Britton & Wilson, *Melochia savannarum, M. nipensis, Ouratea affinis, O. Roigii, Marcgravia calcicola, Haemocharis benitoensis* Britton & Wilson, *Rheedia brevipes, Clusia callosa* Britton & Wilson, *Hypericum ophiticola, Myroxylon rhombifolium* Britton & Wilson, *Lunania subcoriacea* Britton & Wilson, *L. elongata, Daphnopsis oblongifolia* Britton & Wilson, *Psidium nummularioides* Britton & Wilson, *P. navasense* Britton & Wilson, *P. bullatum* Britton & Wilson, *P. ophiticola* Britton & Wilson, *P. saxicola* Britton & Wilson, *Calyptranthes Clementis* Britton & Wilson, *C. Caroli* Britton & Wilson. *C. clarensis* Britton & Wilson, *Eugenia Cowellii* Britton & Wilson, *E. cabanasensis* Britton & Wilson, *E. moensis* Britton & Wilson, *E. havanensis* Britton & Wilson, *E. varia* Britton & Wilson, *E. Earlei* Britton & Wilson, *E. Rocana* Britton & Wilson, *E. clarensis* Britton & Wilson, *E. anafensis* Britton & Wilson, *E. ignota* Britton & Wilson, *E. Bakeri* Britton & Wilson, *Tamonea moensis, Calycogonium saxicola* Britton & Wilson, *Pachyanthus Clementis* P. Wilson. *P. mantuensis* Britton & Wilson, *Ossaea Shaferi* Britton & Wilson, *O. navasensis* Britton & Wilson, *O. nipensis* Britton & Wilson, *Kalmiella simulata* Britton & Wilson, *Rauwolfia linearifolia* Britton & Wilson, *Echites minima* Britton & Wilson, *Exogonium incertum, Nama cubana* P. Wilson, *Varronia Shaferi, Bourreria Taylori, Rochefortia stellata* Britton & Wilson. *R. cubensis* Britton & Wilson, *Duranta arida* Britton & Wilson, *Callicarpa Shaferi* Britton & Wilson, *C. Wrightii* Britton & Wilson, *C. cuneifolia* Britton & Wilson, *C. nipensis* Britton & Wilson, *Vitex Clementis* Britton & Wilson, *Pseudocarpidium Shaferi, Clerodendrum anafense* Britton & Wilson, *C. camagueyense* Britton & Wilson, *Salvia scabrata* Britton & Wilson. *S. cubensis* Britton & Wilson, *Hyptis Shaferi, H. rivularis, Physalis ignota, Solanum moense* Britton & Wilson. *Cestrum Wrightianum* P. Wilson. *C. Taylori* Britton & Wilson. *C. pinetorum*. *Brunfelsia Shaferi* Britton & Wilson, *B. clarensis* Britton & Wilson, **Cheilophyllum** Pennell n. gen. of Scrophulariaceae, *C. radicans* Pennell (*Stemodia radicans* Griseb.), **Silvinula** Pennell n. gen. of Scrophulariaceae, *S. humifusa* Pennell (*Herpestis humifusa* Griseb.), *Caconapea stemodioides* Pennell, *C. decumbens* Pennell (*Herpestis decumbens* Fernald), **Naiadothrix** Pennell n. gen. of Scrophulariaceae, *N. longipes* Pennell, *N. reflexa* Pennell (*Herpestis reflexa* Benth.), *N. myriophylloides* Pennell (*Herpestis myriophylloides* Benth.), **Encopella**

Pennell n. gen. of Scrophulariaceae, *E. tenuifolia* Pennell (*Encopa tenuifolia* Griseb.), **Anisantherina** Pennell n. gen. of Scrophulariaceae, *A. hispidula* Pennell (*Gerardia hispidula* Mart.), *Tabebuia camagueyensis* Britton & Wilson, *T. savannarum*, *T. Cowellii*, **Cotema** Britton & Wilson n. gen. of Bignoniaceae, *C. spiralis* Britton & Wilson (*Tecoma spiralis* Wright), *C. woodfredensis*, *C. apiculata*, *C. holguinensis*, *Gesneria yamuriensis* Britton & Wilson, *G. nipensis* Britton & Wilson, *G. clarensis* Britton & Wilson, *Pinguicula lignicola* Barnhart, *P. benedicta* Barnhart, *Utricularia mixta* Barnhart, *Tubiflora Shaferi* P. Wilson, *Machaeonia minutifolia* Britton & Wilson, *Scolosanthus lucidus*, *Psychotria Clementis*, *P. bermejalensis*, *P. moensis* Britton & Wilson, *P. toensis* Britton & Wilson, *Mitracarpum Fortunii* Britton & Wilson, *Aster Leonis*, *Gundlachia apiculata* Britton & Blake, *G. foliosa* Britton & Blake, *G. cubana* Britton & Blake, *Erigeron Taylori* Britton & Wilson, *E. Earlei* Britton & Wilson, *Borrichia cubana* Britton & Blake, *Spilanthes montana* Britton & Blake, *Chaptalia comptonioides* Britton & Wilson, *C. Shaferi* Britton & Wilson, and *C. Rocana* Britton & Wilson.—*J. M. Greenman.*

1086. CHASE, AGNES. **The Linnaean concept of pearl millet.** Amer. Jour. Bot. **8:** 41–49. 1921.—Owing to the confusion of names for pearl millet, the author has made a careful analysis of the Linnaean names involved in the problem. To bring order out of this confusion, she recommends rejection of the names *Panicum americanum* and *P. cynosuroides*; and suggests appropriate restrictions for the names *Panicum alopecuroides*, *P. glaucum*, and *Holcus spicatus*. She believes that pearl millet furnishes a good example of the "Linnaean concept of species," so frequently urged by botanists who are not systematists.—*E. W. Sinnott.*

1087. COULTER, J. M. **New genera.** [Rev. of: (1) NAKAI, TAKENOSHIN. **Genus novum Oleacearum in Corea media inventum.** Bot. Mag. Tôkyô **33:** 153–154. 1919 (see Bot. Absts. 5, Entry 2386); (2) PENNELL, F. W. **A brief conspectus of the species of Kneiffia, with the characterization of a new allied genus.** Bull. Torrey Bot. Club. **46:** 363–373. 1919 (see Bot. Absts. 5, Entry 2390).] Bot. Gaz. **69:** 96. 1920.

1088. DUMMER, R. A. **A further contribution to our knowledge of the genus Agathosma, Willd., containing descriptions of 23 new species and 3 new varieties.** Ann. Bolus Herb. **3:** 44–62. 1920.—The new species and varieties, all from South Africa, described in the present paper are: *Agathosma humilis* Sond. var. *capitata*, *A. stilbeoides*, *A. Foleyana*, *A. scaberula*, *A. krakadouwensis*, *A. tulbaghensis*, *A. decora*, *A. decora* var. *Buchu*, *A. decora* var. *pseudohybrida*, *A. Sonderiana*, *A. Marlothii*, *A. Keetii*, *A. perplexa*, *A. Pillansiana*, *A. craspedota* E. Mey. var. *eglandulosa*, *A. Pattisonae*, *A. utilis*, *A. mucronulata* Sond. var. *Rudolphii*, *A. Tugwelliae*, *A. Phillipsii*, *A. riversdalensis*, *A. formosissima*, *A. cedrimontana*, *A. Bodkinii*, *A. gracilipetala*, *A. bicolor*, *A. paludosa*, and *A. muizenbergensis* var. *planitiensis*.—*J. M. Greenman.*

1089. DUMMER, R. A. **A note on, and a description of, four new species and two new varieties of the genus Adenandra, Willd.** Ann. Bolus Herb. **3:** 40–43. 1920.—The plants described in this article are all from the Cape Province of South Africa; they are: *Adenandra Fryii*, *A. caledonensis*, *A. viscida* E. & Z. var. *ciliata*, *A. Pottsii*, *A. biseriata* Meyer var. *gracilior*, and *A. Guthriei*.—*J. M. Greenman.*

1090. KUDO, YUSHUN. **Prunellopsis, Labiatae genus novum.** [**Prunellopsis, new genus of Labiatae.**] Bot. Mag. Tôkyô **34:** 181–184. 1920.—A new genus, Prunellopsis, allied to *Prunella* and *Dracocephalum*, is described from Japan with one species, *P. prunelliformis* Kudo.—*Roxana Stinchfield Ferris.*

1091. MAIDEN, J. H. **A critical revision of the genus Eucalyptus.** Vol. V. Part 3. *P. 71–101, pl. 176–179.* William Applegate Gullick: Sydney, 1920.—The present part contains descriptions, critical notes, and illustrations of the following species: *E. ficifolia* F. v. M., *E. calophylla* R. Br., *E. hamaetoxylon* Maiden, *E. maculata* Hook., *E. Mooreana* (Fitzgerald) Maiden, *E. approximans* Maiden, and *E. Stowardi* Maiden.—*Ibid.* Part 4. *P. 103–131, pl. 180–183.* February, 1921. This part treats the following species: *Eucalyptus perfoliata*

R. Br., *E. ptychocarpa* F. v. M., *E. similis* Maiden, E. *lirata* (Fitzgerald) Maiden n. sp., *E. Baileyana* F. v. M., *E. Lane-Poolei* Maiden, *E. Ewartiana* Maiden, *E. Bakeri* Maiden, *E. Jacksoni* Maiden, and *E. eremophila* Maiden.—*Ibid.* Part 5. *P. 133–160, pl. 184–187.* 1921. This part continues with a similar treatment of *Eucalyptus erythrocorys* F. v. M., *E. tetrodonta* F. v. M., *E. odontocarpa* F. v. M., *E. capitellata* Smith, *E. Camfieldi* Maiden, *E. Blaxlandi* Maiden & Cambage, and *E. Normantonensis* Maiden & Cambage.—*J. M. Greenman.*

1092. Maiden, J. H. **The forest flora of New South Wales.** Vol. VII. Part 5. *P. 193–237., pl. 224–247, 12 photographic illustrations.* William Applegate Gullick: Sydney, 1920.—Six species are elaborated in this part, namely, *Archontophoenix Cunninghamiana* Wendl. & Drude, *Eucalyptus dumosa* A. Cunn., *Acacia rigens* A. Cunn., *A. Havilandi* Maiden, *Eremophila Mitchelli* F. v. M., and *E. Sturtii* R. Br. Each species is accompanied by a detailed description, one or more illustrations, and pertinent notes. An appendix contains a chapter on "Insects and Timber Trees."—*J. M. Greenman.*

1093. Miyoshi, Manabu. **Untersuchungen über japanische Kirschen, I. [Investigations of Japanese cherries, I.]** Bot. Mag. Tôkyô 34: 159–177. 1920.—The synonymy and relationships of the true and false equinoctial cherries (species blooming at the spring equinox) are discussed. One new species, *Prunus sacra,* and numerous new forms are named and several new names are proposed.—*Roxana Stinchfield Ferris.*

1094. Miyoshi, Manabu. **Weitere Mitteilungen über die Hängekastanie. [Further contributions concerning the weeping chestnut.]** Bot. Mag. Tôkyô 34: 185–186. 1920.—The author states that specimens of the weeping chestnut, *Castanea pubinervis* C. Schn. var. *pendula* Miyos., grown from seed show the characteristic weeping form, indicating that the variety is fixed. Additional distributional notes are given.—*Roxana Stinchfield Ferris.*

1095. Phillips, E. P. **The genus Borbonia Linn. (Leguminosae).** South African Jour. Sci. 16: 397–410. *Pl. 34–38, and map.* 1920.—The author gives a synoptical revision of *Borbonia,* recognizing 15 species and several varieties. The following are described as new: *B. lanceolata* L. var. *robusta, B. lanceolata* L. var. *villosa, B. undulata* Thunb. var. *ciliata,* and *B. multiflora.*—*J. M. Greenman.*

1096. Phillips, E. P. **Three noteworthy species of plants from South Africa.** South African Jour. Sci. 16: 429–431. *Pl. 39.* 1920.—Critical notes are recorded on *Protea rhodantha* Hook. f., *Kniphofia Northiae* Baker, and *Euphoria Monteira* Hook. f.—*J. M. Greenman.*

1097. Pillans, N. S. **Stapeliae.** Jour. Bot. Soc. South Africa 6: 5–6. 1920.

1098. Wordsworth, R., J. Hutchinson, F. Bolus, and L. Bolus. **Flowering plants collected in South-West Africa by the Percy Sladen Memorial Expedition, 1915–16.** Ann. Bolus Herb. 3: 15–37. 1920.—An annotated list is presented of the flowering plants collected on the expedition mentioned in the title. No new species are recorded.—*J. M. Greenman.*

MISCELLANEOUS, UNCLASSIFIED PUBLICATIONS

B. E. Livingston, *Editor*

S. F. Trelease, *Assistant Editor*

1099. Ramírez, Román. **Asclepiadea hulera. [A rubber plant of the Asclepiadaceae.]** Rev. Agric. [Mexico] 4: 508–509. *1 fig.* 1919.—A brief description is given of *Cryptostegia madagascariensis,* a plant yielding low-grade rubber.—*John A. Stevenson.*

1100. Strand, E. [Rev. of: Schmidt, H. **Geschichte der Entwicklungslehre. (History of the theory of development.)** *549 p.* Alfred Kröner: Leipzig, 1918.] Arch. Naturgesch. Abt. A. 86 : 184. 1920 [1921].—The author presents a consideration of the history of the evolutionary concept; its bearing on cosmology, chemistry, geology, and anthropology, as well as on biology; its relation to the theory of special creation; and its effect upon philosophical thought. —*C. E. Allen.*

ains Title Page, Contents, and Authors' Index for Volume IX

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CONTENTS

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ENTRIES 1101–1683

AGRONOMY

C. V. PIPER, *Editor*

MARY R. BURR, *Assistant Editor*

(See also in this issue Entries 1160, 1324, 1333, 1338, 1386, 1428, 1472, 1558, 1560, 1571, 1611, 1619, 1620, 1621, 1645, 1666, 1677, 1682.)

1101. ANONYMOUS. **Bureau of Sugar Experiment Stations Annual Rept. II. 20th Annual Report of the Bureau of Sugar Experiment Stations. 1920.** Australian Sugar Jour. **12**: 651–655. 1921.—The report covers the period to the end of Oct., 1920.—Experiments with subsoiling as compared with ordinary farm cultivation for sugar cane gave results in favor of subsoiling. Results of experiments on 3 crops subsoiled showed an increase of 9.8 tons of cane and 1.53 tons of cane sugar over the amount obtained from 3 crops with ordinary cultivation. With regard to varieties of the Queensland seedlings planted last year at the Mackay Station, Q. 813 and Q. 1092 germinate and grow quickly, while Q. 970, H. Q. 458, and Q. 1121 are fairly good; Q. 1098 is a later-maturing variety.—*E. K. Tisdale.*

1102. ANONYMOUS. **Crop rotation and mixed farming. (Summary of lecture by the Chief Agriculturist to the Midlands Farmers Association.)** Rhodesia Agric. Jour. **18**: 167–173. *4 pl.* 1921.—Attention is called to the fact that a system of crop rotations must be established in Rhodesia before permanent agricultural stability can be achieved.—*E. M. Doidge.*

1103. ANONYMOUS. **Field Assistant's Report. Extract from Murray, J. C. Bureau of Sugar Experiment Stations Annual Report II. 20th Annual Report of the Bureau of Sugar Experiment Stations. 1920.** Australian Sugar Jour. **12**: 655–657. 1921.—The report deals with the growth of varieties of sugar cane in the Cairns District of Australia. Badila has given the most satisfactory results; Green Goru (24B) grows well. A small quantity of "Pompey" recently introduced by the C. R. S. Co. is promising, judging by its healthy erect appearance and vigorous stool. Shahjahanpur is doing well. This variety is a good striker, has a good root system, stools well, grows in an erect manner, has a high sugar content, and a high resistance to frost.—*E. K. Tisdale.*

1104. ANONYMOUS. **Le soja. [Soybeans.]** Bull. Agric. Congo Belge **11**: 151–186. *Fig. 23–32.* 1920. In the cotton and maize-growing districts soybean is the best annual legume to cultivate, being a fodder plant of great value. The food value of the hay and beans and the methods of cultivating and harvesting the crop are discussed. It is recommended that for hay soybeans and cowpeas be planted together.—*E. M. Doidge.*

1105. Anonymous. **Potato Majestic.** Gard. Chron. 69: 129. *Fig. 57.* 1921.—This is a comparatively new variety, popular, a heavy yielder, white, and immune to the wart disease. It often yields 34 tons per acre. The heaviest tuber weighed 11 pounds and 15 ounces.—*P. L. Ricker.*

1106. Anonymous. **School experiment plots at Yass.** Agric. Gaz. New South Wales 32: 342. 1921.—This is a brief note on cereal trials conducted at Yass.—*L. R. Waldron.*

1107. Annett, H. E. **Some experience with poppy growers in the United Provinces.** Agric. Jour. India 16: 19–23. 1921.—Annett having found that the opium obtained from successive lancings of poppy capsules at intervals of 2 or 3 days showed a progressive decrease in morphine content, the Government of Bengal offered a reward to cultivators bringing opium in 2 portions, one the product of the 1st lancings, the other that of successive lancings. Two years' experience showed that the opium purporting to represent the 1st lancings was lower in morphine than there was reason to expect. An investigation showed that only 54 per cent of the cultivators lived up to their obligations, the remainder through dishonesty or carelessness having failed to keep separate the opium from the 1st lancings.—*W. W. Stockberger.*

1108. Bierei. **Die Bedeutung der Gründüngung im landwirtschaftlichen Betriebe im Allgemeinen und für den Kartoffelbau im Besonderen. [The importance of green manuring in the system of agriculture in general and for potato culture in particular.]** Illus. Landw. Zeitg. 41: 67–68. 1921.—Green manuring is considered indispensable for the increase in yields of potatoes. Depending on environmental conditions and the character of soil, green manuring may be introduced in the rotation either as a main crop, or as a stubble crop, or as an undercrop. The same conditions should determine the selection of the legume to be sown. Lupine, serradella (for lighter soils), and yellow clover (for heavier soils) are considered among the most important.—*M. Shapovalov.*

1109. Blair, A. W., and B. E. Brown. **The influence of fertilizers containing borax on the yield of potatoes and corn. Season 1920.** Soil Sci. 11: 369–383. *Pl. 1–4.* 1921.—Borax in quantities from 1 to 400 pounds per acre and mixed with a fertilizer containing cottonseed meal, acid phosphate, and muriate of potash was applied to corn and potatoes in 3 ways. The borax was drilled in the furrow 2 or 3 weeks before planting, drilled in at the time of planting, or broadcast at the time of planting. For potatoes with the 1st method 50 pounds of borax per acre had little or no effect; 100 pounds reduced the yield $\frac{1}{2}$; and 400 pounds produced a failure. With the 2nd method 30 pounds caused a drop in yield and 50 pounds reduced it to $\frac{1}{2}$. With the 3rd method 50 pounds decreased the yield slightly. For corn with the 1st method germination was reduced with 20 pounds per acre, as little as 5 or 10 pounds reducing it with the 2nd and 3rd methods. Using the 1st method a depression of yield was produced by 100 pounds per acre but none by 50 pounds; with the 2nd and 3rd methods 50 pounds reduced the yield to $\frac{1}{2}$.—*W. J. Robbins.*

1110. Breakwell, E. **Progress report on farmers' grass plots.** Agric. Gaz. New South Wales 32: 364. 1921.—Brief notes are given on *Phalaris bulbosa*, *Pennisetum longistylum*, and on other grasses of lesser importance grown at Dorrigo and Hargreaves.—*L. R. Waldron.*

1111. Bressel, Kurt. **Erfahrungen im Anbau von Frühkartoffeln in der Börde. [Experiences in raising early potatoes.]** Illus. Landw. Zeitg. 41: 75. 1921.—The advisability of changing seed potatoes annually, or at least bi-ennially, is emphasized, and a few suggestions as to their care and culture are given.—*M. Shapovalov.*

1112. Chung, H. L. **Report of the Agronomy Division.** Hawaii Agric. Exp. Sta. Rept. 1919: 44–49. *Pl. 5–6.* 1920.—Guam and Cuban corn varieties have been under test, producing respectively 52.5 and 30.4 bushels per acre; both are resistant to the leaf hopper. An interesting mutant in Early Refugee beans is noted. Reports on experimental work with sweet potatoes, field turnips, dryland taro, pigeon peas, cassava, edible canna, field beets, field carrots, Irish potatoes, annual white sweet clover, alfalfa, and various grasses are included.—*J. M. Westgate.*

1113. Compton, R. H., and J. W. Mathews. **The cultivation of buchu.** Jour. Dept. Agric. South Africa 2: 223–228. *3 fig.* 1921.—The climate of the winter-rain belt is naturally suited to the requirements of buchu; the plant is propagated by seed and "dry" cultivation is practiced. Directions are given for harvesting and marketing buchu, and the yield of resin and oil from various species of *Barosma* is compared.—*E. M. Doidge.*

1114. Czuber, E. **Beziehung zwischen Parzellengrösse und Fehler der Einzelbeobachtung bei Felderversuchen. [Relation between size of plats and error in detached observations in field experiments.]** Zeitschr. Landw. Versuchsw. Deutschösterreich 23: 61–68. 1920.—The results of a series of plat experiments, in which the yields of rye, oats, potatoes, and rape were reported upon by W. Vageler in Jour. Landw. for 1919, page 97, are discussed. The present writer takes Vageler's data and by a different mathematical treatment obtains different results for the ratio of percentage of error to size of plats. His methods are given in detail.—*John W. Roberts.*

1115. Downing, R. G. **Trials of canary seed.** Agric. Gaz. New South Wales 32: 308. 1921.—Trials were conducted with *Phalaris canariensis* (?) on 4 experimental farms with fairly satisfactory results. At Cowra 730 pounds of seed per acre were secured.—*L. R. Waldron.*

1116. Eckenbrecher, C. **Anbauversuche der Deutschen Kartoffel-Kultur-Station im Jahre 1920. [Cultural studies of the German potato-culture station in 1920.]** Illus. Landw. Zeitg. 41: 74–75. *With colored pl.* 1921.—German varieties of potatoes (21) were studied with respect to tuber yields, starch content, and starch yields. The highest tuber-yielding variety (Blücher) appeared to be also the highest starch-yielding variety and, in general, a great deal more parallelism exists between the high total yields and the high starch yields than between either of these 2 and the starch content.—*M. Shapovalov.*

1117. Galang, F. G. **Yam culture.** Philippine Agric. Rev. 13: 63–72. *Pl. 3.* 1920.—Cultural directions and yield data are given for various species of *Dioscorea*, especially *D. alata* and *D. esculenta* (*D. aculeata*).—*E. D. Merrill.*

1118. Gaylord, F. C. **More and better potatoes.** Proc. Amer. Soc. Hort. Sci. 17: 99–102. 1920 [1921].—Striking results have been obtained following an organized effort in Indiana to demonstrate to the growers the best methods of handling the potato crop. The average increase in production in 1919 of 12 demonstration fields was about 25 per cent.—*H. A. Jones.*

1119. Ghesquiere, Jean. **Rapport concernant les machines pour la traitement des semences de coton contre les teignes. [Report on machinery for the treatment of cotton seed against moths.]** Bull. Agric. Congo Belge 11: 147–150. 1920.

1120. Goff, R. A. **Report of the Glenwood Substation.** Hawaii Agric. Exp. Sta. Rept. 1919: 68–73. 1920.—At the Glenwood Substation experiments were conducted with Irish potatoes, sweet potatoes, Maui red beans, dryland taro, licorice roots, poha (*Physalis* spp.), alfalfa, sweet clover, corn sorghum, edible canna, cassava, pigeon peas, and grasses.—*J. M. Westgate.*

1121. Heinze, B. **Der erfolgreiche Anbau der Oelbohne in unserem eigenen Lande. [The successful cultivation of the soybean in our own land.]** Illus. Landw. Zeitg. 41: 59–60. 1921.—The author calls attention to the importance of the soybean as a food for man and animals and argues for the possibility of its successful culture in Germany.—*John W. Roberts.*

1122. Hiltner, L. **Über die Impfung der Futter- und Zuckerrüben. [Inoculation of feed and sugar beets.]** Mitteil. Deutsch. Landw. Ges. 36: 243. 1921.—A brief discussion is presented of the conclusions reached concerning the value of some German bacterial preparations to non-leguminous plants, with special reference to an inoculating material obtained from soils exceptionally well adapted to the growing of beets. In very limited experiments beets

treated with this preparation produced crops exceeding those from the untreated plots by as much as 26.7 per cent. It is stated that the treatment of non-legumes with cultures of bacteria is still in the experimental stage.—*Lewis T. Leonard.*

1123. Isidro, R. A. **Comparative culture of upland and lowland rice with special reference to cost of production and distribution of income.** Philippine Agric. 8: 213–233. 1920.—The general conclusions are that lowland culture gives a higher yield than upland culture, but the cost per unit area is higher.—*E. D. Merrill.*

1124. K [enoyer], L. A. [Rev. of: Chilcott, E. C., and John S. Cole. **Sub-soiling, deep tilling and soil dynamiting in the Great Plains.** Jour. Agric. Res. 14: 481–521. 1918.] Jour. Indian Bot. 2: 92. 1921.

1125. Kiesselbach, T. A., and F. D. Keim. **The regional adaptation of corn in Nebraska.** Nebraska Agric. Exp. Sta. Res. Bull. 19. *64 p., 13 fig.* 1921.—The general morphological characters of the plant and the histological structure of the leaf were studied for corn types known to be acclimated to various regional areas of Nebraska. Adaptation of corn to divergent climatic conditions consists in a morphological rather than in a histological reaction. While some of the vegetative characters, such as total leaf area and plant weight, may differ as much as 300 per cent, in the case of native types growing in the more adverse as compared with the most favored parts of the state, no important histological leaf characters exhibited a difference of more than 15 per cent.—The actual hereditary difference (apart from environmental effects) between types adapted to favorable and to unfavorable climatic conditions may be brought out by comparing both in the same environment under favorable conditions. When eastern and western Nebraska corn were grown comparably at the Nebraska Experiment Station in Lancaster County, western Nebraska corn was much reduced in plant size, leaf area, and dry matter. Plants from seed of both sources were rather similar as to leaf thickness, epidermal and cuticular thickness, relative number of vascular bundles, number of stomata per unit leaf area, and size of stomata. It is concluded that adaptation of corn to a region of moisture shortage consists chiefly in the reduction of vegetative development and consequent reduction in the amount of water used by the individual plant. Comparative yield tests of corn from various sources indicate that, in general, native seed is superior to imported seed, though it is possible to introduce seed from a distance which gives entirely satisfactory results.—*T. A. Kiesselbach.*

1126. Koch, Pieter. **Curing of Turkish tobacco.** Jour. Dept. Agric. Union of South Africa 2: 409–421. *Fig. 1–7.* 1921.—The author discusses the best methods of handling Turkish tobacco in the Western Province of South Africa. Ripening, harvesting, and curing are treated in separate paragraphs. There are 3 stages of curing: 1st, wilting in a wilting room; 2nd, drying in the sun; and 3rd, fermentation. Each stage is described in detail.—*E. M. Doidge.*

1127. Krauss, F. G. **Report of the Extension Division.** Hawaii Agric. Exp. Sta. Rept. 1919: 56–67. *Pl. 9–10.* 1920.—At the Haiku Demonstration and Experimental Farm variety tests and breeding work with numerous varieties of diversified crops were conducted. One thousand acres of pigeon peas were planted as a result of the Haiku demonstrations.—*J. M. Westgate.*

1128. Lang, E. **Die betriebswirtschaftliche Stellung des Kartoffelbaues unter den gegenwärtigen Verhältnissen.** [Economic organization of the potato industry under present conditions.] Illus. Landw. Zeitg. 41: 65–67. 1921.—Owing to the impossibility of increasing the area for potato culture, it is imperative to produce more on a given area. In this connection, the importance of extensive use of farm machinery, better organization and utilization of labor, proper fertilization, and the use of good seed are discussed.—*M. Shapovalov.*

1129. Lansdell, K. A. **A South African gum. (Combretum erythrophyllum Burch.)** Jour. Dept. Agric. Union of South Africa 1: 834–837. 1920.—This plant, growing in the neighborhood of Pretoria, produces a gum which promises to be as valuable in tanning as Gum Tragacanth. Description of the tree with illustrations and copy of a report on the gum by the Imperial Institute are given.—*E. M. Doidge.*

1130. Lansdell, K. A. **Pappea capensis seed.** Jour. Dept. Agric. Union of South Africa 1: 760–764. *1 pl.* 1920.—It was found that whole seed of *Pappea capensis* yield 47.8 per cent of oil and the decorticated kernels 73.5 per cent. The oil is of a non-drying type suitable for soap making or use as a lubricant. The chemical analysis of the meal after the oil is expressed shows a slight inferiority to cotton seed meal. No feeding tests of the meal were conducted. An illustration and description of the plant are given.—*E. M. Doidge.*

1131. Leplae, E. **La culture du coton au Congo belge (1915–1919). [Cotton culture in Belgian Congo, 1915–1919.]** Bull. Agric. Congo Belge 11: 80–106. *Fig. 19–22.* 1920.—This is an account of the establishment and extension of cotton culture during the period under review. The natives of Maniema, Sankuru, and Kasai have adopted cotton as a staple crop; the sale of cotton produces a considerable revenue and the acreage under cotton increases rapidly. The natives planted 45 hectares in 1916, 800 in 1917, 1000 in 1918, and 2000 in 1920. Of the varieties tested Triumph Big Boll and Simpkins have given the best results.—*E. M. Doidge.*

1132. Mainwairing, C. **Maize for export, with notes on grades and grading.** Rhodesia Agric. Jour. 18: 174–178. *1 fig.* 1921.—Grades for export maize in the Union of South Africa, Portuguese East Africa, and Southern Rhodesia are given. Special advice is given as to condition and quality of bags, and general advice with reference to exporting.—*E. M. Doidge.*

1133. Mason, T. G. **Nep.** Agric. News [Barbados] 20: 22. 1921.—After tracing the life history of the lint hair, as given by Balls, the author concludes that the prospects of reducing "nepiness" are not promising under ordinary conditions, the only feasible suggestion being that of growing a strain of cotton similar to that isolated in St. Vincent by Dr. Harland, and characterized by a low rate of boll-shedding. If this were planted so that maximum boll-production occurred in the drier months, the deposit of secondary cellulose might be expected to proceed uniformly. Success would seem to depend on the recognition and elimination of strains forming an abnormal number of flabby fibers.—*J. S. Dash.*

1134. Mason, T. G. **The water factor in crop production.** Agric. News [Barbados] 19: 355. 1921.—The 2 main points discussed by the author are (1) selecting plants adapted to local conditions, and (2) adjusting the water factor of the environment to the needs of the plant. Certain cultural methods are referred to,—dust mulch, the use of a trash mulch for sugar-cane, and wider spacing of certain crops, such as maize.—*J. S. Dash.*

1135. Melle, Henry A., and Sydney M. Stent. **Fodder and pasture grasses of South Africa. 1. Sudan grass. (Sorghum sudanense Stapf.)** Jour. Dept. Agric. Union of South Africa 2: 425–433. *4 fig.* 1921.—Sudan grass is closely related to the kafir, broom, and sweet sorghums, but yields superior hay; 3 or 4 cuttings can be obtained under favorable conditions. The yields vary from 2 to 8 tons of hay per acre. Sudan grass grows well in districts suitable for kafir corn and is recommended for cultivation in areas where it is too hot and dry for the successful growing of teff.—*E. M. Doidge.*

1136. Münter, F. **Sonnenblumen und Helianthi und Mais als Silagemasse. [Sunflowers, Helianthi, and maize as silage.]** Illus. Landw. Zeitg. 41: 44. 1921.—The author reports chemical analyses of dried sunflower, Helianthi, and maize at various stages in their development. The Helianthi were highest in albumen content, but the latter decreased in all the plants as they approached maturity. When the Helianthi are harvested late for silage they should be mixed with leguminous plants. In general, the sunflowers should be cut at any time between

the beginning of full bloom and seed in the "milk" stage. Maize should be harvested shortly before the grains are mature, because of the increase in nitrogen-free extracts and fats at that stage.—*John W. Roberts.*

1137. Paguirigan, D. B. **Tobacco growing in the Philippines.** Bur. Agric. Philippine Islands Bull. 34. *26 p., 9 pl.* 1919.—A popular treatise on the subject with special reference to Philippine conditions.—*E. D. Merrill.*

1138. Parish, E. **Wheat and its cultivation.** Jour. Dept. Agric. Union of South Africa 2: 322–332. 1921.—Extracts are presented from Bull. 22, Dept. Agric. Victoria, Australia, with notes concerning the applicability of wheat growing in South Africa, with special reference to the southwestern wheat areas of the Cape.—*E. M. Doidge.*

1139. Pate, W. F., and R. Y. Winters. **Spacing cotton on North Carolina soils.** North Carolina Agric. Ext. Serv. Circ. 112. *7 p.* 1921.—Tests extending over a series of years show that best yields of cotton in several localities of North Carolina were secured from 3½-foot rows with 16 inches—in 1 locality 12—between hills.—*F. A. Wolf.*

1140. Pethybridge, George H. **Is it possible to distinguish the seeds of wild white clover from those of ordinary white clover by chemical means during a germination test.** Econ. Proc. Roy. Dublin Soc. 2: 248–258. 1919.—As the seed obtained from wild white clover produces much longer-lived stands than that obtained from cultivated white clover and commands a higher price, an effort was made to determine whether adulteration of the former with the latter could be detected. Seedlings from wild stock from different sources were found generally to give off HCN in sufficient quantity for detection by the picric acid test; those from ordinary stock obtained from England generally gave off much less or none at all. However, some of the ordinary clover seed imported from Canada and America gave off HCN in germinating, making the HCN test of value chiefly where negative results were obtained, indicating adulteration with acyanophoric ordinary seed; and of little value where the wild seed is adulterated with cyanophoric American or Canadian ordinary seed.—*Charles Drechsler.*

1141. Rasmussen, H. J. **Fodringsspörgsmaalet.** [Questions on feeding.] Tidsskr. Landokonomi 1921[4]: 142–162. 1921.—A lecture in which Danish farmers are urged (1) to raise more feed at home, especially timothy and alfalfa, so as to eliminate as far as possible the importation of animal feed; (2) to build silos and feed ensilage in the same manner as American farmers. The results of feeding experiments by Armsby of the Pennsylvania State College are quoted.—*Albert A. Hansen.*

1142. Rosenfeld, Arthur H. **Saving money with frozen cane.** Internat. Sugar Jour. 23: 316–319. 1921.—After a killing freeze in northern Argentina, the frozen cane was used as a mulch between alternate rows of 1st-year stubble,—following the principle of using trash in the Cuban cane fields; a saving of labor and money resulted. In the unirrigated sections, the mulched fields produced slightly better yields than the regularly cultivated ones.—*C. Rumbold.*

1143. Rümker, und R. Leidner. **Sommerweizenanbauversuche.** [Culture experiments with summer wheat.] Illus. Landw. Zeitg. 41: 58–59. 1921.—A report is presented of plat experiments for the testing of different varieties in Bornstedt (1919) and Emerslebn (1920). The results are given in tabular form and include time of heading, time of blooming, resistance to rust and smut, length and thickness of heads, color of grains, weight of 100 grains, and yield.—*John W. Roberts.*

1144. Shepherd, A. N. **Farmers' experiment plots. Potato trials, 1920. Murrumbidgee irrigation areas.** Agric. Gaz. New South Wales 32: 309–312. 1921.—Four settlers cooperated in conducting trials, 7 varieties being grown. Up-to-Date produced the largest yields. Mineral fertilizers increased the net returns, in one case by $140 per acre.—*L. R. Waldron.*

1145. Snell, Karl. **Das Kartoffelsorten Archiv des Forschungs-Institutes für Kartoffelbau. [Potato-variety records of the institute for investigations in potato culture.]** Illus. Landw. Zeitg. 41: 74. *1 colored pl., 1 fig.* 1921.—A system of photographic records of characteristic features of various varieties has been perfected and gives very satisfactory results as a substitute for fresh specimens.—*M. Shapovalov.*

1146. Stümpel, E. **Verdoppelung der Kartoffelernten durch starke Stickstoffdüngung. [Doubling potato yields by heavy nitrogenous fertilization.]** Illus. Landw. Zeitg. 41: 69. 1921. —Attention is drawn to the advantages of using commercial fertilizers and lime for potato fields.—*M. Shapovalov.*

1147. Thompson, O. A. **Twelfth to eighteenth annual reports Edgeley Sub-station, 1914–1920.** North Dakota Agric. Exp. Sta. Bull. 145. *44 p., 1 fig.* 1921.—Yields are presented of 24 varieties of spring wheat for 1908–1916 and for 10 varieties for 1920. The 1920 yields varied greatly due to attacks of stem rust. The new rust-resistant variety of common wheat, Kota, greatly outyielded all other common varieties and was exceeded only by Monad, Acme, and "D-5,"—rust-resistant durums. Flax variety yields are given for 1912–1916; but little variation is shown. The oat variety Siberian White, and the barley variety Oderbrucker, have been consistent high yielders.—In a comparative trial of forage crops extending over 12 years, brome-grass (*Bromus inermis*) yielded on an average 1.36 tons, alfalfa 1.04 tons, common red clover 0.58 tons, and maize 1.98 tons per acre. Foxtail millets yielded an annual average of about 2.5 tons of hay for 5 years. Notes are given on field peas, sweet clover, slender wheat-grass (*Agropyron tenerum*), and rape.—Early Ohio and Early Six Weeks are said to be the best-yielding potato varieties. Notes are given on potato culture.—In a trial covering 6 years, oats were seeded at 10 different rates, from 3 to 12 pecks per acre. The highest net yield was secured from the 8-peck rate. In a similar trial with barley the 6-peck rate gave the highest net yield. Similar trials were conducted for both common and durum wheats for a period of 7 years with rates from 2 to 11 pecks per acre. With durum wheat the largest net yield was secured from the 7-peck rate, closely approached by that of the 5-peck rate. With common wheat the largest net yield resulted from sowing 8 pecks per acre, but seedings of 5, 6, and 7 pecks gave only slightly lower yields.—Early fall plowing produced better yields in continuous wheat culture trials than later fall plowing. All spring methods, on the average, outyielded all the fall methods, in preparing ground for continuous wheat culture, by 3.2 bushels per acre.—In continuous cropping experiments with common and durum wheats, oats, and barley, plowing 6 inches deep gave yields as good or better than those secured from 6-inch plowing accompanied by subsoiling alone or subsoiling and packing. Subsoiling was done every 4th year.—Yields of grain are given for wheat, oats, and barley, and fodder of maize when grown under methods of (1) continuous cropping and (2) alternate cropping with clean summer tillage. Yields of wheat were increased by 14 per cent under alternate clean summer tillage. Increased barley yield was but slightly better on the clean summer tillage. Yields of oats were increased 52 per cent by alternate tillage. An absolute loss of maize fodder resulted when grown on clean summer tillage, the cleanly cultivated soil seeming to have an inhibitory effect upon maize yields.—When wheat or oats followed fallow in a rotation the increase in yield, compared with that secured from these crops following small grain in rotation, was not over 20 per cent.—Averaging the results of 13 years, little or no advantage was secured in plowing under a green manure crop of winter rye, field peas, or sweet clover preparatory to growing wheat or oats, in comparison to the same crops grown after clean summer fallow. In a 4-year rotation where wheat followed a clean-cultivated, manured summer fallow, the increase in yields of wheat compared with unmanured trials was 1.8 bushels per acre, or 11 per cent. The increased yield of fodder of the succeeding maize crop was 877 pounds, or 25 per cent, and the increase in yield of the next succeeding oat crop 8.2 bushels, or 24 per cent. In similar rotations, in which, however, oats followed manured fallow, the increases in yield were: Oats, 1.3 bushels, or 3 per cent; maize fodder, 967 pounds, or 28 per cent; and wheat, 1.7 bushels, or 10 per cent. These results are the averages of 12 years.—In a series of 3-year rotations, wheat and barley yielded more following maize than when following clean summer tillage (average of 14 years' results). Oats yielded 4.9 bushels, or 12

per cent, more after fallow than after maize. As an average of results for 13 years, oats following small grain yielded 4.9 bushels, or 13 per cent, more than when following sod crops,—alfalfa, smooth brome-grass, and clover; the lowest yield followed alfalfa. Wheat, oats, and barley following maize yielded more than when following small grains.—In a comparison of disking versus plowing maize ground as a preparation for wheat and oats, the results for an average of 14 years were slightly in favor of the disked ground.—In fertilizer experiments with wheat, oats, barley, and maize, using manure and mineral fertilizers, distinct positive results were secured only with maize. Progress data are presented upon experiments designed to maintain soil productivity on the Edgeley loam.—Notes are given on suitable trees and methods of tree planting, especially with relation to farmsteads. Suitable varieties of apples, plums, and small fruits are indicated.—*L. R. Waldron.*

1148. Walters, J. A. T. **Winter wheat. Results of co-operative experiments 1921.** Rhodesia Agric. Jour. 18: 181–183. *1 pl.* 1921.—A summary is presented of reports of experiments with 4 varieties of winter wheat, namely, Early Gluyas, Florence, Black Persian, and Yellow Cross; results are given for both irrigated and unirrigated lands.—*E. M. Doidge.*

1149. Wester, P. J. **Cultural directions for field crops and vegetables.** Philippine Agric. Rev. 13: 80–88. *Pl. 1–7.* 1920.—Brief notes are given on the general cultivation of vegetables and field crops, such as ragi, rape, sembu, and sunflowers, with tabulated directions for planting.—*E. D. Merrill.*

1150. Wester, P. J. **Notes on adlay.** Philippine Agric. Rev. 13: 217–222. *Pl. 1–4.* 1920. —The author strongly urges the more extensive cultivation and utilization of *Coix lachryma-jobi* Linn. var. *mayuen* Stapf, a variety of the common Job's tears with soft, thin, involucre instead of the very hard one in the typical form. This has been cultivated for many centuries by the more backward peoples in the Indo-Malayan region.—*E. D. Merrill.*

1151. Whittet, J. N. **A promising introduction. Kikuyu grass (Pennisetum longistylum Hochst.).** Agric. Gaz. New South Wales 32: 313–322. *5 fig.* 1921.—Reports from 10 experiments with this grass are briefly stated. The grass holds out much promise for Australian conditions. Cultural notes and an analysis are given. A test shows the grass to be favorable for milk production.—In a palatability test with 14 grass species, Kikuyu grass ranked 3rd, *Bromus inermis* 1st, *Phleum pratense* 6th, *Poa pratensis* 7th, and *Bouteloua oligostachya* 13th.—*L. R. Waldron.*

1152. Williams, C. B. I. **Fertilizers for crops commonly grown in North Carolina.** Bull. North Carolina Dept. Agric. 1921: *13 p.* May, 1921.—Recommendations are given of the kind and amount of commercial fertilizer to be used for cotton, cereals, tobacco, and leguminous crops in the coastal plain, Piedmont, and mountain sections of North Carolina.—*F. A. Wolf.*

1153. Williams, C. B. **Report of the Division of Agronomy.** Ann. Rept. North Carolina Agric. Exp. Sta. 43: 15–31. 1920 [1921].—A general statement is presented covering the investigations in soil fertility at the several test farms, tests with nitrate of soda on cotton in the Piedmont section, fertilizer tests with wheat in the mountain section, and results of seed selection with soybean, cotton, wheat, and corn.—*F. A. Wolf.*

1154. Zielstorff, W. **Über Haferdüngungsversuche mit fallenden Phosphorsaüregaben. [Fertilizer experiments on oats, using decreasing quantities of phosphoric acid.]** Mitteil. Deutsch. Landw. Ges. 36: 213–215. 1921.—Field experiments were carried out at Polenshof and Ludwigswalde; also pot experiments with soils from these fields. Though neither field reacted in any way to phosphoric acid, a decided need for this ingredient was shown in the pot experiments; this may have been due to a deficiency in rainfall during the summer months. There was also lack of agreement between the field and pot experiments as regards potash, for which no explanation appears. Further experiments are necessary to furnish an explanation.—*Albert R. Merz.*

1155. Zook, L. L. **Winter wheat seed-bed preparation.** Nebraska Agric. Exp. Sta. Bull. 178. *16 p., 1 fig.* 1921.—Results are reported from the North Platte Nebraska Exp. Substa. secured during 8 years, 1912-1919, from packed and unpacked soil plowed at various depths. On 4 plats plowed at each of 4 depths (3, 7, 10, and 14 inches) for 8 years: (1) The highest yields were secured from the intermediate depths of plowing; (2) the lowest average yield was secured from plowing 3 inches deep; (3) the increase in yield from 7-inch plowing over that secured from 3-inch plowing was sufficient to justify plowing at the greater depth; (4) the yields from plowing 7 and 10 inches deep were practically the same,—no advantage was gained from plowing at a depth greater than 7 inches; (5) the 14-inch, or very deep, plowing produced the lowest yields of any except the 3-inch plowing; (6) the depth of plowing had no appreciable effect upon the storage or use of soil moisture; (7) higher yields were secured from early than from late fall plowing, but the differences were not great; (8) better yields followed packing. Deep tillage experiments conducted by the U. S. Dept. Agric. in 12 states showed the practice to be unprofitable at all stations.—*T. A. Kiesselbach.*

BIBLIOGRAPHY, BIOGRAPHY, AND HISTORY

Neil E. Stevens, *Editor*

(See also in this issue Entries 1244, 1280, 1281, 1311, 1447, 1592, 1606, 1683)

1156. Anonymous. **In commemoration of the centenary of the birth of Sir William Macleay.** Proc. Linn. Soc. New South Wales **45**: 218–219. 1920.—William Macleay (1820–1891) came to Australia in 1839 with his cousin, William Sharp Macleay (1792–1865). In memory of the scientific usefulness and influence of the family, exhibits of relics and portraits were shown and memorials prepared. The Macleay collections are now in the possession of the University of Sydney.—*Eloise Gerry.*

1157. Anonymous. **John Goodyer and Lobel.** Gard. Chron. **69**: 157–158. 1921.—Manuscripts were exhibited by Dr. R. T. Günther at a recent meeting of the Linnean Society of London which were bequeathed to Magdalen College by John Goodyer with his botanical library in 1664. These include his own translations of Theophrastus and Dioscorides, the latter said to have never been undertaken by any other scholar. One volume contains a long list of grasses with synonyms and short descriptions copied from Lobel's MSS. (now lost?); an index of plants in Goodyer's hand, an index to Gerard's Herbal (1597) and Stonehouse's Catalogue of plants in his garden at Darfield in 1640. The loose papers comprise part of the MS. for Lobel's projected Stirpium Illustrationes, now bound in 3 parts, the 1st containing descriptions of 223 species of grasses. Selections from this by How were printed in 1655. Two other volumes contain synonyms of plants used by Goodyer, and a small fern and moss collection. The miscellaneous papers include dated descriptions by Goodyer of some 90 new or rare species, and lists of plants from the gardens of William Coys in Essex in 1616. Goodyer's notes also show that Mr. "Coel," Lobel's son-in-law, was identical with Master James Cole, London merchant, mentioned by Gerard. Lobel had another son-in-law, Ludovicus Myreus, a London apothecary referred to by Clusius in his Exotica.—*P. L. Ricker.*

1158. Anonymous. **Mr. Joseph Cheal, V. M. H.** Gard. Chron. **69**: 170. *Portrait.* 1921. —Cheal is specially interested in fruit growing and is a leading spirit in the National Dahlia Society.—*P. L. Ricker.*

1159. Anonymous. **Mr. Kingdon Ward.** Gard. Chron. **69**: 122. *Portrait.* 1921.—A brief notice is presented of Ward's work as botanical explorer in China and announcement of a new expedition to Szechuan and Yunnan.—*P. L. Ricker.*

1160. Anonymous. **Origin of the Uba cane. Noel Deerr's opinion versus local account.** South African Sugar Jour. **5**: 187, 189. 1921.—Deerr's article (see Bot. Absts. 8, Entry 16), which is here quoted entire, concludes that the Uba came to Natal, by way of Mauritius, from

Brazil, whence it received its name from "Vuba," used in Brasil for sugar cane as early as 1650; but the local story reaffirms its Indian origin. About 30 years ago sugar cane varieties from Egypt, Louisiana, Mauritius, West Indies, and India were planted on the Reunion estate of Mr. de Pass, near Durban, Natal. The last box to arrive was left underneath the bins in the mill until the tops were almost dead, but, when planted, 2 of them grew and flourished, and eventually a variety was clearly established. On the label attached to the cane tops only 3 letters could be found, which were deciphered as "Uba," but there was no doubt that these tops came from Poona, and it is assumed that the last letters of this word were misread as "Uba." This is the local account as given by George Wade, overseer of the mill, 5 years after the finding of the cane tops.—*E. K. Tisdale.*

1161. Anonymous. **Sir Frederick W. Moore, V. M. H.** Gard. Chron. **69**: 158. *Portrait.* 1921.—A biographical sketch is given of the keeper of the Royal Botanical Gardens, Glasnevin, Dublin, in which position he was preceded by his father, David Moore, who took charge in 1835 and held the position for 41 years. The son has now been there 41½ years.—*P. L. Ricker.*

1162. Anonymous. **The drug business in Colonial times.** Pharm. Era **53**: 199–200. 1920.—Gleanings from newspaper advertisements of the 18th century, with reproduction of one by G. Duykinck of New York, August 3, 1769.—*Neil E. Stevens.*

1163. Arber, Agnes. **Plants and flowers in Chinese poetry.** Gard. Chron. **69**: 163. 1921.—References are given to recent translations of Chinese poetry by H. A. Giles (1898) and A. D. Waley (1918 and 1919).—*P. L. Ricker.*

1164. Beille, Lucien. **Un botaniste bordelais. Léonce Motelay 1830–1917. [Léonce Motelay, 1830–1917, a Bordelais botanist.]** Actes Soc. Linn. Bordeaux **70**: 493–509. *Portrait.* 1917–18 [1920?].—Motelay was a member of the Linnean Society of Bordeaux for more than 60 years and contributed many papers to its publications, the monograph of *Isoëtes* by Motelay and Vendries, presented in 1879, being of special note. His herbarium, consisting of a general collection and flora of the Gironde, was presented to the city of Bordeaux in 1906.—*M. F. Warner.*

1165. Biers, Paul. **L'herbier tricolore de Bory de Saint-Vincent. [The tricolored herbarium of Bory de Saint-Vincent.]** Bull. Mus. Hist. Nat. Paris **26**: 429–431. 1920.—The tradition that Bory, like Bosc and other liberal botanists, used red, white, and blue papers in his herbarium as a protest against the restoration of the white flag of the monarchy in France, receives confirmation in the discovery of a portfolio of sheets in the 3 colors, some of them showing the impression of algae, among the remainders of the herbarium of Bornet, who possessed Bory's entire collection of algae; also of blue wrappers containing single red sheets evidently identical with a red mount found with one of Bory's fungi.—*M. F. Warner.*

1166. [Britten, James.] **Magnus Spence.** Jour. Botany **57**: 293. 1919.—Spence died at St. Ola, Orkney, Aug. 20, 1919, aged 66. He was a teacher, long headmaster at Deerness, who published the Flora Orcadensis (1914), and had special knowledge of the marine algae of the Orkneys.—*Neil E. Stevens.*

1167. [Britten, James.] **William Black [i.e., Brack] Boyd.** Jour. Botany **56**: 221–222. 1918.—Boyd died Mar. 6, 1918, in his 88th year. He was one of the best-known Scottish amateur gardeners, greatly interested in alpines, and had one of the finest collections in the United Kingdom. He collected a number of very rare Scottish plants.—*Neil E. Stevens.*

1168. [Britten, James.] **William Frederick Miller.** Jour. Botany **56**: 221. 1918.—Miller was born Sept. 18, 1834, the only son of William Miller the well known engraver, and was himself in the business of engraving and color printing. He communicated to the Journal of Botany many notes on rare Scottish plants from his vacation rambles, and later, when he retired from business and removed to Somersetshire, notes on plants of that county. He died Apr. 28, 1918.—*Neil E. Stevens.*

1169. Camus, Fernand. **Documents pour servir a l'histoire de la botanique dans l'Ouest de la France. I. Une lettre inedite de François Bonamy. [Documents relating to the history of botany in the west of France. I. An unpublished letter of François Bonamy.]** Bull. Soc. Sci. Nat. Ouest France III, 5: 31–51. 1915–19 [1920?].—A letter found in the Bornet-Thuret cryptogamic collection at the Paris Natural History Museum, transmitting to A. L. de Jussieu specimens of *Ephedra*, is occasion for notes on Bonamy's Florae Nannetensis Prodromus (1782) and its Addenda (1785), with a few personal data in regard to the author.—*M. F. Warner.*

1170. Christy, Miller. **Wistman's wood on Dartmoor.** Country Life [London] 49: 812—813. *Illus.* 1921.—This is a unique bit of woodland in the heart of Devon, established in a heap of angular masses of granite, and stretching along the steep side of the valley of the East Dart for perhaps 400 yards, nowhere over 100 yards wide. With the exception of 3 or 4 bushes of mountain ash, it consists of oaks, all apparently *Quercus pedunculata.* Though of great age, they are amazingly dwarfed and stunted, their average height being about 10 feet, the highest not over 15, while in girth the average is 40–60 inches, and 1 tree measured 78. They are in vigorous condition, producing acorns, and a number of young trees are found among them. There is a remarkable epiphytic growth of mosses, lichens, and polypody, possible only on trees of great age and in an exceedingly moist climate, there being an average rainfall possibly exceeding 80 inches. The wood was described by Tristram Risdon 300 years ago exactly as it exists today, and although the tradition that it is entered in the Domesday Book is unsupported, records indicate that some of the trees are well over 500 years old, and the wood itself far older. It has figured in most of the writings on local history and topography, also in the stories of Eden Phillpotts. Its name probably indicates that a "wistman," or "wiseman," an ancient holy man or hermit, once dwelt in it.—*M. F. Warner.*

1171. Docters van Leeuwen, W. M. **In memoriam Dr. S. H. Koorders.** Bull. Jard. Bot. Buitenzorg III, 2: 237–241. *Portrait.* 1920.—Dr. Koorders died in November 1919, after more than 35 years in the forest service of the Dutch East Indies. The value of his botanical work for the colonies, and especially for the Buitenzorg Garden, which he enriched by the addition of over 40,000 herbarium specimens, is noted; also his more important publications on the forest flora of Java and other works on the colonial flora. A few notes are added from a more extended biography by E. H. B. Brascamp, in Tectona 13: 378–504. 1920.—*M. F. Warner.*

1172. Druce, G. C. **Edward Morgan's Hortus Siccus.** Bot. Soc. and Exchange Club British Isles Rept. (1919) 5: 722–724. 1920.—Among the Ashmole MSS. in the Bodleian Library at Oxford are three folio volumes entitled: Hortus Siccus sive Collectio Plantarum ab ipso Eduardo Morgano Facta Ordine Alphabetico, bis Mille Circiter Plantarum Species Exhibens. This collection, which appears to have been begun in 1672, is probably that of the Edward Morgan who lived at Bodesclan, now Bodysgallan, in Wales, who accompanied Thomas Johnson on his expedition into North Wales in 1639.—*G. Claridge Druce.*

1173. [Druce, G. C.] **Ferdinand Bauer and his landscape drawings.** Bot. Soc. and Exchange Club British Isles Rept. (1917) 5: 143–144. 1918.—A collection of water colors by this botanical artist (1760–1829) is noted with brief details of his life.—*G. Claridge Druce.*

1174. [Druce, G. C.] **John Radcliffe, Bishop of London, as botanist.** Bot. Soc. and Exchange Club British Isles Rept. (1917) 5: 142. 1918.—A copy of Sibthorp's Flora Oxoniensis, which was bought by Sir William Osler in 1917, contains numerous MS. notes on plants of Ewelme in Oxfordshire. These have been traced to Bishop Radcliffe (1749–1828), and indicate that he had an excellent knowledge of botany.—*G. Claridge Druce.*

1175. [Druce, G. C.] **Obituaries.** Bot. Soc. and Exchange Club British Isles Rept. (1917) 5: 86–93. 1918.—Obituary notices of the following are included: Sarah M. Baker (died 1917?); Robert Braithwaite (1824–1917); Walter Butt (1850?–1917); Charles Thomas Druery (1843–1917); Edward Evans (1846–1917); William Foggitt (1835–1917); Alan Gordon

Harper (1889–1917); Ruth Holden (1890–1917); Samuel Margerison (1857–1917); George Edward Massee (1850–1917); John Platts (1852–1917); Harry Sanderson (1871–1917); Worthington G. Smith (1835–1917).—*G. Claridge Druce.*

1176. [DRUCE, G. C.] **Obituaries.** Bot. Soc. and Exchange Club British Isles Rept. (1918) **5**: 349–365. 1919.—Brief biographical notices of the following: John Amphlett (died 1918) by CARLETON REA; James E. Bagnall (1830–1918); Clarence Bicknell (1842–1918) by J. W. WHITE; William Brack Boyd (1831–1918); Edward Fry (1827–1918); Joseph John Geake (1890–1918); Charles Baylis Green (died 1918) by I. M. ROPER; Reginald Philip Gregory (1879–1918); Edward Walter Hunnybun (1848–1918); Ernest David Marquand (1848–1918); T. W. Martyn (died 1918); William Frederick Miller (1834–1918); John Mitchinson (1833–1918); Ethel Sargant (1863–1918) by BEATRICE TAYLOR.—*G. Claridge Druce.*

1177. [DRUCE, G. C.] **Obituaries.** Bot. Soc. and Exchange Club British Isles Rept. (1919) **5**: 618–634. 1920.—The following biographical notices are included: Robert Chapman Davie (1887–1919); James M'Andrew (1836–1917); Edward Shearburn Marshall (1858–1919) by F. J. HANBURY; William Osler (1849–1919); Samuel Lister Petty (died 1919); Charles Lancelot Shadwell (1840–1919); Frederick John Smith (1853–1919); Magnus Spence (1853–1919); James William Helenus Trail (1851–1919); William Tuckwell (1829–1919); Cosslett Herbert Waddell (1858–1919); Anthony Wallis (died 1919); George Stephen West (1876–1919). Brief mention is also made of the following: Casimir de Candolle; Prof. Cogniaux; W. G. Farlow; F. Ducane Godman (died 1919); John Hopkinson (died 1919); A. E. Lechmere; Hector Leveillé; James Sawyer (died 1919); Henri Sudre (1862–1918).—*G. Claridge Druce.*

1178. [DRUCE, G. C.] **Robert Dick, of Thurso.** Bot. Soc. and Exchange Club British Isles Rept. (1918) **5**: 417. 1919.

1179. [DRUCE, G. C.] **The dates of publication of Curtis's "Flora Londinensis."** Bot. Soc. and Exchange Club British Isles Rept. (1918) **5**: 412–414. 1919.—A note supplementing those of W. A. Clark, and Jackson and Pryor in Journal of Botany (1895 and 1881 respectively) by giving dates for the first 10 parts of the 6th fascicle (1791–98), covering 54 species. No. lxi-lxvi were issued before the end of 1791, lxvii-lxx before the end of 1794; lxxi probably appeared in 1795, while lxxii did not come out until about 1798.—*G. Claridge Druce.*

1180. [DRUCE, G. C.] [Rev. of: HARVEY GIBSON, R. J. **Outlines of the history of botany.** *viii + 274 p.* A. & C. Black: London, 1919 (see Bot. Absts. 7, Entry 1596).] Bot. Soc. and Exchange Club British Isles Rept. (1919) **5**: 594–596. 1920.

1181. GRAVIS, AUGUSTE. **La morphologie végétale.** [**Plant morphology.**] Bull. Acad. Roy. Belgique Cl. Sci. **1920**: 624–665. 1920 [1921].—There are presented: A history of plant morphology; progress achieved; importance of the problems presented and the efforts to solve them. The author gives a synoptical table of this history.—*Henri Micheels.*

1182. HOFFMAN, G. N. **Mt. Lebanon medicine makers—the Shakers.** Pharm. Era **53**: 197–198, 229–231. *4 fig.* 1920.—Their medicinal preparations from native plants, begun as early as 1825, at one time amounted to 75 tons per year. They devised the vacuum process of distillation about 1830, and cultivated drug plants at an early date. The growing and sale of garden seeds was another important industry.—*Neil E. Stevens.*

1183. J[ACKSON], B. D. **James William Helenus Trail.** Proc. Linn. Soc. London **132**: 49–51. 1921.—A sketch of the life and work of Professor Trail (1851–1919), of Aberdeen, is given.—*M. F. Warner.*

1184. J[ACKSON], B. D. **John Hopkinson.** Proc. Linn. Soc. London **132**: 43–45. 1921.—John Hopkinson (1844–1919), actively engaged in business as a piano manufacturer, gave his leisure to scientific pursuits, and for years specially studied graptolites. At the age of 15 he began his herbarium, which in later life he gave to the St. Albans local museum. He was a

member of numerous scientific societies and one of the founders of the Watford, afterwards Hertfordshire, Natural History Society, of which he was an active officer until his death.—*M. F. Warner.*

1185. [Jackson, B. D.] **Methods of botanical illustration during four centuries.** Proc. Linn. Soc. London 132: 7–9. 1921.—A lecture on illustration, covering: (1) Surface design, including the "block books" and the fine woodcuts of early herbals; (2) copper plate—etching and engraving; (3) reproduction by chemical agency such as photography, lithography, and the like.—*M. F. Warner.*

1186. J[ackson], B. D. **Prof. George Stephen West.** Proc. Linn. Soc. London 132: 52–53. 1921.—Prof. West (1876–1918) of Birmingham, the leading authority upon freshwater algae of the United Kingdom, was the son of the prominent algologist William West, with whom he jointly published many works, also writing independently many papers and 2 books in his special subject: British Freshwater Algae (1904), and Algae (1916).—*M. F. Warner.*

1187. J[ackson], B. D. **Rev. Edward Shearburn Marshall.** Proc. Linn. Soc. London 132: 45–46. 1921.—A brief sketch is given of the life and botanical work of E. S. Marshall (1858–1918).—*M. F. Warner.*

1188. J[ackson], B. D. **William James Tutcher.** Proc. Linn. Soc. London 132: 51–52. 1921.—Tutcher was born 1867 and died in March, 1920. He was Superintendent of the Botanical and Forestry Department of Hongkong, where he had spent nearly 30 years, giving much time to botanical exploration. In 1912 he collaborated with S. T. Dunn in the publication of the Flora of Kwantung and Hongkong.—*M. F. Warner.*

1189. Kronfeld, E. M. **Sagenpflanzen und Pflanzensagen. [Legendary plants and plant lore.]** *96 p., 23 fig.* Theod. Thomas: Leipzig, [1919.]—The book includes popular legends and literary associations of plants in connection with wars and deeds of heroism.—*Neil E. Stevens.*

1190. Malte, M. O. **James Melville Macoun, C. M. G.** Canadian Field Nat. 34: 38–40. *Portrait.* 1920.—Macoun was born in Belleville, Ontario, in 1862, the son of Professor John Macoun; he died January 8, 1920. The present article brings out especially Macoun's work as a field naturalist and explorer.—*M. F. Warner.*

1191. Mariboe, Carl. **Leopold Helweg.** Tidsskr. Landøkonomi 1920: 388–393. *Portrait.* 1920.—Leopold Hans Andreas Helweg was born in Copenhagen March 2, 1851, and died August 6, 1920. In 1886 he became director of the investigations on root crops of the Danish society for the improvement of cultivated plants; when the experimental work was taken over by the government in 1893, Helweg continued as director until his death. He wrote many articles for agricultural papers, and a monograph of the varieties of carrot. From 1886 to 1901 he was editor of Gartner–Tidende; he edited the Nordisk Illustreret Havebrugsleksikon (Scandinavian illustrated gardners' dictionary), and in 1895 published a work on plant forcing.—*M. F. Warner.*

1192. R[endle], A. B. **William Robert Carver.** Jour. Botany 56: 334–335. 1918.—Carver (1860–1918) was for many years departmental clerk in the cryptogamic section of the Department of Botany of the British Museum (Nat. Hist.), and had an extensive knowledge of seaweeds.—*Neil E. Stevens.*

1193. Ricalton, James. **Famous and interesting trees.** Amer. Forestry 27: 216–224. *10 fig.* 1920.—Banyan trees (*Ficus religiosa* or *Ficus indica*), the olive, rubber trees, and others are described.—*Chas. H. Otis.*

1194. Salmon, C. E. **Anthony Wallis.** Jour. Botany 57: 347–348. 1919.—Wallis (1879–1919) was inspector in the Education Department. While at Cambridge he compiled The

Flora of the Cambridge District for Marr's Natural History of Cambridgeshire, and later communicated new localities and rare plants to Druce's Flora of Cambridgeshire.—*Neil E. Stevens.*

1195. Smith, A. L. **William Gilson Farlow.** Proc. Linn. Soc. London 132: 38–39. 1921.—A brief sketch of Prof. Farlow (1844–1919), commenting on his cordial relations with British botanists, is presented.—*M. F. Warner.*

1196. Steele, J. G. **History of the California College of Pharmacy.** Pacific Pharm. 12: 78–79, 100–104, 129–131, 151–157, 179–182. 1918.

1197. Sturmer, J. W. **1820—A bit of history.** Western Druggist 42: 110–112. 1920.—A comparison of apothecaries of today with those of one hundred years ago is made.—*C. M. Sterling.*

1198. Velu, H. **Les fleurs—leur rôle social.** [The function of flowers in society.] Bull. Soc. Hort. Maroc 8: 50–59. 1920.—The significance of exhibitions and floral feasts and the possibilities of Morocco as a source of medicinal and perfume plants are discussed, with extracts from the legendary and literary lore of flowers.—*M. F. Warner.*

1199. Vines, S. H. **Simon Schwendener.** Proc. Linn. Soc. London 132: 47–49. 1921.—Schwendener was born February 10, 1829, and died May 10, 1919. He began his university course at Geneva under Alphonse de Candolle, and graduated at Zurich under Oswald Heer in 1856. Coming into relations with Naegeli, Schwendener turned his attention to the microscopical anatomy of plants. His "contribution to the right understanding of Lichens is his first claim to remembrance as a botanist. His second claim is that he founded and prosecuted to some extent, the study of physiological anatomy." In 1879 he became professor of botany at Berlin, where he remained to the end of his life, and inspired a number of his students to research in physiological anatomy.—*M. F. Warner.*

1200. Yurin Vassil, P. **K sud'be Tingutinskogo s.-kh. uchastka v sviazi s vozrozhdeniem sel'skogo khoziaistva na iugo-vostoke Rossii.** [The fate of the Tingutinski experimental grounds.] Narodnoe Khoziaistvo [Moscow] 1920: 69–70. 1920.—Some very important work, particularly on irrigation, was carried on in the pre-war period on the Tingutinski agricultural grounds, in the former province of Saratov, comprising some 5416 acres. These are now in a lamentable condition due to the circumstances of the civil war. However, measures already have been taken for their reconstruction, and great developments in the future are expected.—*M. Shapovalov.*

BOTANICAL EDUCATION

C. Stuart Gager, *Editor*

Alfred Gundersen, *Assistant Editor*

(See also in this issue Entries 1244, 1393, 1395 1607)

1201. Alburtis, S. S. **How school children study trees.** Amer. Forestry 27: 291–298. *14 fig.* 1921.

1202. Beard, J. G. **The business of teaching.** Druggists Circ. 65: 123–126. 1921.—The author discusses the importance of more and better educational training, and continued scientific research in pharmacy.—*C. M. Sterling.*

1203. Böhmer, J. G. **Landbrukshöiskolens skogbruksavdeling.** [Forestry division of the agricultural high school, Norway.] Tidsskr. Skogbruk 29: 73–78. 1921.—Revised curriculum, in forestry, according to the law of July 23, 1919, is presented for the 3-year course at the Norwegian School of Agriculture.—*J. A. Larsen.*

1204. Borgmann, W. **Ausbau des forstlichen Hochschulunterrichts an der Hessischen Landesuniversität Giessen. [Expansion of academic forestry course at the University of Giessen.]** Fortwiss. Centralbl. 43: 62–69. 1921.—Even before the war the movement was inaugurated to combine the forest schools of Tübingen, Giessen, and Karlsruhe in 1 school at Heidelberg. Since the war, this plan has been abandoned, but Württemberg and Baden have combined their courses, given at Freiburg. This location is not convenient for Hesse, and it has been decided to maintain and enlarge the course at Giessen. The article appeals form oral and material support from all interested persons and organizations.—*W. N. Sparhawk.*

1205. Cooper, Zada M. **Report of the committee to investigate "short term," correspondence, summer, and other similar courses.** Pacific Pharm. 12: 267–272. 1919.

1206. Fabricius. [Rev. of: Linsbauer, Karl. Wiesner, Julius. **Elemente der wissenschaftlichen Botanik. I Band. Anatomie und Physiologie der Pflanzen.** *6th ed., 412 p., 303 fig.* Alfred Hölder: Berlin and Leipzig, 1920.] Forstwiss. Centralbl. 43: 75–77. 1921.—The present is an entirely revised edition. Fabricius expresses the wish that botanists pay a little more attention to trees instead of confining their discussions and illustrations almost entirely to crop or weed plants. For instance, the discussion of the influence of light upon seed germination in *Ranunculus, Allium,* or *Pinguicula,* could have been illustrated just as well with results of research on forest-tree seeds.—*W. N. Sparhawk.*

1207. Gathercoal, E. N. **Bacteriology in pharmacy colleges.** Druggists Circ. 64: 171–172. 1920.

1208. Gravis, A. **Éléments de morphologie végétale. [Elements of vegetable morphology.]** *16 × 26 cm., 204 p., 32 pl.* H. Vaillant-Carmanne: Liège, 1920.—This text book is intended for use in a course in plant morphology based on the study of representative types. It comprises 3 main parts. The 1st, "Notions of Cytology," deals with cells—their structure, physiological responses, and origin by division. In the 2nd part, "Principal Types of Vegetable Organization," representative types of the great plant groups are taken up with reference to their organs of vegetation, asexual propagation, sexual reproduction, and spore production. This part includes also a synthetic survey of the evolution of the plant kingdom. In the 3rd part, "Study of Angiospermous Plants," the organography, anatomy, and classification of flowering plants are considered in somewhat greater detail. The book is illustrated with 32 plates of diagrammatic figures. An unusual feature is a collection of quotations from the writings of eminent men on the subjects of science, scientific method, study, etc.—*L. W. Sharp.*

1209. Hepler, J. R. **Teaching systematic olericulture.** Proc. Amer. Soc. Hort. Sci. 17: 169–172. 1920 [1921].—The method of study and presentation of a college course in systematic vegetable gardening is discussed.—*H. A. Jones.*

1210. Rudd, Wortley F. **Bacteriology in the two year course.** Druggists Circ. 65: 127–128. 1921.—Arguments are presented in favor of a short course in bacteriology intended to enable pharmacists to take a more active part in various public health activities.—*C. M. Sterling.*

1211. Schneider, Albert. **A full-time four-year college of pharmacy course.** Pacific Pharm. 12: 185–188. 1918.—An outline of studies is presented for a full 4-year course in pharmacy and suggestions on teaching methods and equipment of teachers.—*C. M. Sterling.*

1212. Schüpfer. [Rev. of: Köllner, F. **Forstwirtschaft.** *84 p., 26 fig.* Paul Parey: Berlin, 1921.] Forstwiss. Centralbl. 43: 189–190. 1921.—This is a brief elementary forestry textbook for the use of agricultural schools. Schüpfer points out several misstatements.—*W. N. Sparhawk.*

1213. Svessenguth, Karl. [Rev. of: Kraepelin, Karl. **Einführung in die Biologie.** (Introduction to biology.) *4th ed.* B. G. Teubner: Leipzig and Berlin, 1919.] Forstwiss. Centralbl. **43**: 73–74. 1921.—A most excellent and well illustrated textbook for the higher schools, as well as for self-instruction. The physiological side has been emphasized more than in previous editions, and chapters on heredity, genetics, and other subjects have been added.—*W. N. Sparhawk.*

1214. Svessenguth, Karl. [Rev. of: Miehe, H. **Allgemeine Biologie.** (General biology.) Vol. 130 of the series, "Aus Natur und Geisteswelt."] Forstwiss. Centralbl. **43**: 74–75. 1921.

1215. Wells, B. W. **A method of teaching the evolution of the land plants.** Torreya 21: 45–47. *1 pl.* 1921.—The comparative method constitutes the only vital approach to the story of plant evolution. The types must be brought together so that they can be automatically compared. The plate, which is the work of a freshman student, illustrates how this may be done graphically. The life cycles are drawn concentrically, the lowest in the center. The significant stages are marked out by radii. Each circle is filled in by the student as he finishes his study of the type. All the evolutionary changes in a given structure are seen by following its radius outward.—*J. C. Nelson.*

CYTOLOGY

Gilbert M. Smith, *Editor*
George S. Bryan, *Assistant Editor*

(See in this issue Entries 1296, 1297 1298, 1300, 1370, 1515)

FOREST BOTANY AND FORESTRY

Raphael Zon, *Editor*
J. H. Hofmann, *Assistant Editor*

(See also in this issue Entries 1193, 1203, 1204, 1212, 1547, 1559, 1561, 1565, 1601, 1602, 1677, 1682)

1216. Anonymous. **Das Reichsforstgesetz.** [The forest law for the German Empire.] Forstwiss. Centralbl. **43**: 37–39. 1921.—This is the text of the proposed Imperial forest law formulated by the Imperial Forestry Council (Reichsforstwirtschaftsrat) in September, 1920. It is designed to make the practice of forestry compulsory on all forest lands in the empire, regardless of ownership. Administration of the laws, as well as the details of the laws themselves, are left for the most part to the individual states.—*W. N. Sparhawk.*

1217. Anonymous. **Forestry in relation to agriculture.** Agric. News [Barbados] **20**: 34. 1921.—The author discusses the differences between forestry and agriculture, pointing out where the two overlap. Forestry in tropical America, now and for some time to come, should proceed only on lines of organization, survey, and judicious cutting, and to a lesser degree along those of reafforestation, mensuration, high finance, and working plans.—*J. S. Dash.*

1218. Anonymous. **Indberetning om det Norske skogvesen.** [Report of the Norwegian Forest Service.] Indeberet. Norske Skogv. **1919**: 1–130. 1921.—A very complete and comprehensive report of the Director for the calendar year 1919 is presented, setting forth all forest activities in the different districts. The net receipt was 4,624,685 kroner; the total cut 378,918,325 cubic meters; there were 108 forest fires which covered about 200 hectares and caused a damage of 21,446 kroner. The personnel consists of 3 inspectors, 2 assessors, 24 assistants and 504 rangers or "Vogtere." The service planted 552,977 trees.—*J. A. Larsen.*

1219. Anonymous. **Lieferung von Waldsamen an die Entente. [Delivery of forest seeds › the Entente.]** Deutsch. Forstzeitg. 36: 220. 1921.—Germany is required to deliver to the ntente countries stocks of forest-tree seeds and plants over a period of some 10 years. In ne spring of 1921 the deliveries to France, Belgium, and Italy aggregate 6700 kgr. of pine seed nd 2100 kgr. of spruce seed, besides considerable quantities of ash seed.—*W. N. Sparhawk.*

1220. Anonymous. **Lumber used in the motor vehicle industry.** Sci. Amer. Monthly : 274–275. 1921.

1221. Anonymous. **Satzung des Verbandes "Bayerische Waldversicherung." [Constiution of the association "Bavarian Forest Insurance."]** Forstwiss. Centralbl. 43: 31–37. 1921.—'he text of the constitution is given.—*W. N. Sparhawk.*

1222. Anonymous. **Steigerung des Ertrages der deutschen Waldungen. [Increasing the ield of German forests.]** Deutsch. Forstzeitg. 36: 125–126. 1921.—The suggestion, made t the Brussels financial conference, that the production of German forests could be increased, impossible of fulfillment, because Germany lost 1.5 million hectares of forest by the peace reaty and is already cutting as much as the annual growth, or more. In 1912, 47.8 million ubic meters of timber were cut, ⅗ of which was construction material (Nutzholz); the remainig forests cannot yield more than 40 million cubic meters without diminishing the forest apital.—*W. N. Sparhawk.*

1223. Anonymous. **The forest reserves of Trinidad and Tobago.** Agric. News [Barbados] 9: 374. 1920.—A report by C. S. Rogers, Conservator of Forests, is discussed. The policy f the Government is to reserve certain areas for (a) the protection of the water supply, the reservation of favorable climatic influences, and the maintenance of suitable breeding places or the bird and insect friends of agriculture; and (b) the production of timber and other orest products necessary for the welfare of the community.—*J. S. Dash.*

1224. Anonymous. [Rev. of: Coppet, M. de, und A. Henne. **Allgemeine Orientierung ber Kriegswirtschaftliche Massnahmen betreffend Waldwirtschaft, Nutzungen, und Holzerkehr 1914–1919. (Wartime measures dealing with forest management, utilization, and imber trade.)** Bern, 1920.] Forstwiss. Centralbl. 43: 78–79. 1921.—The book recounts vartime regulations in Switzerland and their effect on Swiss forests and economic life. The var changed Switzerland from a wood-importing country to a wood-exporter, but in 1920 she gain became an importer. In 1914 imports of wood exceeded exports by 20,230,000 francs, vhile in 1918 exports led by 117,970,000 francs. In 1913 the net import, in volume, of imber, lumber, and firewood amounted to 557,513 cubic meters, while in 1916, the year of reatest export (by volume), the net export was 883,689 cubic meters.—*W. N. Sparhawk.*

1225. Billwiller, R. **Über die Föhnsturmkatastrophe vom 4/5 Januar 1919 im Berner)berland. [The catastrophe caused by the southerly winds of January 4 and 5, 1919, in the igher altitudes of the Bern region.]** Schweiz. Zeitschr. Forstw. 72: 2–11. *1 map.* 1921.— contribution by Billwiller and observations by Von Greyerz are presented. The damage lone by this storm was greater than any recorded for more than a decade. The damaged imber was about 90 per cent uprooted and 10 per cent broken, and was thrown in all directions n some localities and in a northeasterly direction in others. A total of 807,550 cubic meters vas windthrown, and about 200 hectares were reduced to the non-productive state.—*J. V. Hofmann.*

1226. Cieslar, A. **Über die Erntezeit der Früchte der gemeinen Esche (Fraxinus excelsior ..). [Concerning the time for collecting seed of the common ash (Fraxinus excelsior).]** Cenralbl. Gesam. Forstw. 46: 90–100. 1920.—Despite many years of silvicultural experience vith ash, there is still comparatively little known regarding the best time and methods of ollecting, storing, and planting the seed. In nature, ash seed does not generally germinate intil the 2nd year. The author experimented to ascertain chiefly whether it could not be erminated the 1st year after ripening. Seed was collected Sept. 17, Nov. 17, Jan. 8, and Feb. 28.

That gathered on the first 2 dates was handled by 3 methods: (1) Sowing immediately in seed beds; (2) storing in moist sand until sowed in the spring; (3) hanging up in bags in the store house until sowed in the spring. The seed gathered in January was handled by the 2 last-mentioned methods and that gathered in February only by the last method. In the 1st spring (1918) germination took place and plants developed only from the September seed that had been either sowed directly or stored in sand. In all other cases germination did not take place until the 2nd spring (1919), when all the remaining classes of seed germinated, the percentage of germination increasing the later the date of collecting the seed.—*R. H. Weidman.*

1227. Dahl, A. L. **Some special uses of redwood.** Sci. Amer. 124:286, 297. *4 fig.* 1921.

1228. Dock, H. **Die Stereophotogrammetrie und ihre Bedeutung für die Forstwirtschaft. [Stereophotogrammetry and its application in forest management.]** Centralbl. Gesam. Forstw. **46:** 65–90. 1920.—The author discusses in detail the phototopographic method of surveying, including a discussion of the theory of the method, description of the instruments, and an illustration of the use of the method on an actual area. The essential field instrument is the phototheodolite and the office instruments are the stereokomparator and the stereoautograph. The last is a drafting instrument of complicated mechanism and is evidently a more recent development and refinement in the office work of the camera surveying method. The author is an engineer and the article is purely in the domain of engineering.—*R. H. Weidman.*

1229. Eckstein, Fritz. **Ueber die Lebensweise von Thanasimus (Clerus) formicarius Latr. [Notes on the life history of Thanasimus (Clerus) formicarius Latr.]** Forstwiss. Centralbl. **43:** 57–62. 1921.—But little has been written concerning the life history of this insect, which is generally considered to be of great importance as an enemy of the bark beetles, especially *Myelophilus piniperda.* This paper outlines the life cycle of the beetle (approximately 1 year), and compares it with that of *Myelophilus.* The increase is not very rapid, since the female lays only 20 or 30 eggs, and the larvae develop more slowly than those of *Myelophilus* or the other bark beetles (*M. minor, Hylastes ater, Tomicus typographus,* and others). The latter reproduce much more rapidly. It is concluded that *Clerus* is of comparatively little importance in combating the bark beetles, although it helps to keep their numbers in check.—*W. N. Sparhawk.*

1230. Ehrhorn, E. M. **Report of the Chief Plant Inspector.** Rept. Bd. Commissioners Agric. and Forest. Hawaii **1919–1920:** 75–85. *Pl. 16–22.* 1921.—Packages containing plants and plant products to the number of 579,207 were inspected for insect and fungous diseases. Presence of citrus canker (*Psudomonas citri*) in Honolulu is reported.—*J. M. Westgate.*

1231. Endres. **Die Bayerische Waldversicherung. [Bavarian forest insurance.]** Forstwiss. Centralbl. **43:** 1–6. 1921.—The new forest insurance association, formed in Bavaria in 1920, embodies some new principles which it is hoped will make insurance of forests more practicable. Private individuals, as such, cannot insure their forests; they must do so through the medium of their communes or through associations. The business is limited to fire insurance at first, but it is planned later to cover losses by insects, diseases, wind, etc. Insurance applies to the entire forest property in Bavaria of each owner who takes out a policy, and premiums are determined on a flat area basis, regardless of species or age of stand. Indemnities are limited to a value of not to exceed 1000 marks per hectare, unless the owner has paid extra premium for a higher insurance. The insurance association has adopted another feature to encourage forest loans. It contracts with the lender to protect him against losses due either to fire or to felling of timber contrary to agreement by the owner, and thereby makes his loan much more secure.—*W. N. Sparhawk.*

1232. Endres. [Rev. of: Engler, Arnold. **Untersuchungen über den Einfluss des Waldes auf den Stand der Gewässer. (Influence of forest cover on water supplies.)** Mitteil. Schweiz. Zentralanst. Forst. Versuchsw. **12:** 1-626. *58 fig.* 1919 (see Bot. Absts. 9, Entry 710).] Forstwiss. Centralbl. **43:** 114–119. 1921.—Endres outlines Engler's results on the 2 areas

(Sperbelgraben and Rappengraben), and points out several weak points in the way the project was carried out; for instance, (1) the 2 areas were in several respects not entirely comparable, and (2) the lack of satisfactory records of the actual amount of precipitation on the experimental areas. He does not feel entirely convinced by Engler's figures, but believes that no amount of exact measurement can absolutely solve the question of the relation between forests and water.—*W. N. Sparhawk.*

1233. Fabricius. [Rev. of: Bertog, Hermann. **Die Beschaffung des Kiefernsamens insbesondere seine Selbstgewinnung.** [The gathering of pine seed.] *124 p., 8 fig.* J. Neumann: Neudamm, 1920.] Forstwiss. Centralbl. 43: 71-72. 1921.—This book, based on the results of research by Cieslar, Schott, Engler, Kienitz, Haack, and Dengler, is written especially for private foresters and forest owners. It brings out very clearly the desirability of collecting one's own seed, instead of relying on seedsmen, both because of the uncertainty as to origin of commercial seed, and because such seed may have been handled in such a way as to seriously affect its quality. Figures are given to show that self-collected seed costs much less than that obtained from dealers.—*W. N. Sparhawk.*

1234. Fabricius. [Rev. of: Borgmann, Wilhelm. **Die Begründung und Erziehung von Holzbeständen.** [Formation and tending of timber stands.] *215 p., 35 fig.* Paul Parey: Berlin, 1920.] Forstwiss. Centralbl. 43: 27-29. 1921.—The book is not a text book on silviculture, but is an excellent popular treatise for the use of forest owners who are not technically trained in forestry.—*W. N. Sparhawk.*

1235. Fabricius. [Rev. of: Solla, R. E. **Holzgewächse zur Winterszeit. Anleitung zum Bestimmen entlaubter Holzgewächse.** [Woody plants in winter. Guide for the identification of woody plants in the absence of their leaves.] *42 p., 50 fig.* Theodor Fischer: Freiburg i. Br., 1920.] Forstwiss Centralbl. 43: 79. 1921.—The book is simple and usable, and contains keys for the identification of 56 species of deciduous trees and 80 species of shrubs of central and southern Europe.—*W. N. Sparhawk.*

1236. Fabricius. [Rev. of: Wiebecke, von. **Der Dauerwald in 16 Fragen und Antworten für den Gebrauch im Walde.** (The "continuous forest.") Stettin.] Forstwiss Centralbl. 43: 195-198. 1921.—Von Wiebecke's "Dauerwald" is the same silvicultural system as that used by von Kalitsch in Bärenthorn. In spite of all the claims made for it, Fabricius points out that it has certain disadvantages as compared with the clear cutting systems, and that it is essentially only a selection system under a new name.—*W. N. Sparhawk.*

1237. Fabricius. [Rev. of: Wilda, Hermann. **Das Holz, Aufbau, Eigenschaften und Verwendung.** (Wood, its structure, properties, and use.) *154 p., 109 fig.* Walter de Gruyter & Co.: Berlin and Leipzig, 1920.] Forstwiss. Centralbl. 43: 190-191. 1921.—This book attempts to give in a form adapted for popular use all the essential facts about wood and its uses. In attempting to condense the material, the author has sacrificed much in the way of completeness and accuracy, especially on the scientific side.—*W. N. Sparhawk.*

1238. Fries, Thore C. E. **Björkskogsgränsens höjdläge inom Tromsö Amt.** [Upper limit of birch in Tromso district, Norway.] Tiddsskr. Skogbr. 29: 48-72. 1921.—An examination of the causes in the variation of the upper limit of birch, *Betula odorata*, at the northern limit of its distribution.—*J. A. Larsen.*

1239. Frost, S. **Forestry from the air.** Amer. Forestry 27: 278-280. *2 fig.* 1921.—The author concerns himself with the use of airplanes in forest mapping, reconnaissance, and other operations in a Canadian forest.—*Chas. H. Otis.*

1240. Goossens, M. **Notes sur un peuplement de parasoliers aux environs de Ganda-Sundi.** [Note on a parasol tree association in the neighborhood of Ganda-Sundi.] Bull. Agric. Congo Belge 11: 74-79. *Fig. 17-18.* 1920.—The parasol tree (*Musanga Smithii*) grows very

readily in forest clearings and abandoned plantations. It has been recommended as a shade tree for cacao plantations but has not proved suitable. Several other uses are suggested; it is particularly suitable as raw material for the manufacture of paper, and would probably prove remunerative if cultivated for this purpose.—*E. M. Doidge.*

1241. HARRER, FR. **Harzgewinnung in Amerika.** [Resin production in America.] Forstwiss. Centralbl. 43: 130–137. 1921.—The methods of harvesting and distilling resin in Florida are briefly described, with old statistics of production and exports of turpentine and rosin. It is concluded that the U. S. A. will in a short time be unable to more than supply its own requirements. Germany could theoretically supply her own needs for turpentine and pine oil, but not for rosin, if the question of cost were left out of consideration. Unless substitutes can be derived from coal tar distillation, rosin supplies must be sought in other countries, especially the tropics.—*W. N. Sparhawk.*

1242. HEES. **Klasseneinteilung des Nadel-Stammholzes.** [Classification of conifer logs.] Deutsch. Forstzeitg. 36: 199. 1921.—Softwoods, like hardwoods, should be classified according to diameters instead of by the total cubic volume of the piece, regardless of size. With the present system, short thick sticks suitable for lumber are often classed with long slender ones suitable only for mine props.—*W. N. Sparhawk.*

1243. HEIBERG, Axel. **Det Norske Skogselskap.** [The Norwegian forestry association.] Tidsskr. Skogbr. 28: 187–200. *Pl. 10.* 1920.—The author sums up the results of an inspection trip of the forest plantations on the west coast of Norway near Stavanger and Bergen. These plantations are up to 50 years old and consist of Norway spruce, Scotch pine, Douglas fir, noble fir, oak, and birch. The soil is generally excellent for reforestation and the local sentiment in favor of this work very good, thanks to the energetic leadership of a few men. Private owners are required by law to cut according to the State's dictum and to replant denuded tracts.—*J. A. Larsen.*

1244. HOHENADL, W. **Das Versuchswesen und das wirtschaftliche Prinzip in der Forstwirtschaft.** [Research and the economic principle in forest practice.] Forstwiss. Centralbl. 43: 50–57, 84–100, 137–151. 1921.—In view of the recent suggestion that forest research in Bavaria be divorced from the forest schools and provided for in a separate state research institute, the author reviews briefly the development of forest research in Bavaria. When first organized under the leadership of GANGHOFER in 1875, it was independent of the schools, and the economic purpose was emphasized, namely, to determine scientific principles and to devise ways for applying them in forest practice, with the object of insuring a continuous production of maximum values with a minimum of outlay. The reorganization in 1882 transferred research to the forest department of the University of Munich, where it has since remained, and provided for a combination of the purely research objective with training in scientific forestry. To again set research apart by itself would surely not help to secure the application of its findings in actual forest practice, for even now many of the principles evolved by research are far from being assimilated by the practitioners. Forestry has not kept pace with other industries in improving its technique and organization of work to meet changing conditions, but has practically stood still. The author reviews the development of industry from the phase of the individual handworker to the present-day phase of large factory units with division of labor and dependence on the engineer or technician, not only for developing mechanical methods and processes but also for scientifically organizing the work and personnel. All such engineering work is based very largely on mathematical research,—cost accounting, time studies, measurements of various sorts. Forestry has lagged behind because of the forms of ownership of forests: small peasant owners; state and communes not interested solely in the most profitable management; and large private owners whose management is guided by tradition or by a desire to maintain game preserves. Foresters themselves have been very conservative and slow to adopt new ideas.—The chief problems for forestry research are problems of measurement (of trees, stands, forest sites and site factors), and of the correlation of these measurements with different conditions of growth or different methods of management.

These studies are necessary in addition to fundamental research, because the long period required to grow timber and the great diversity of conditions require the gradual accumulation of the results of actual experience by many investigators, and their results must be expressed in the same terms and must be comparable. The investigator must work in the forest and in closest touch with practitioners, because it is as important that the scientific principles be applied in actual practice as it is to discover the principles. It is desirable that the research institution be responsible for the economic management of a demonstration forest, since this will help to keep science and practice closely tied together.—*W. N. Sparhawk.*

1245. Holm, C. J. **Et Forsög med fremmede Lövtraer. [Experiments with exotic deciduous trees.]** Forst. Forsögsv. Danmark **5**: 293–300. 1920.—Experimental plantations were begun on Seeland, Denmark, in 1912. The species most extensively tried were *Quercus rubra, Q. palustris,* and *Betula odorata.* Tests were also made of *Quercus coccinea, Betula lutea, B. Maximowiczii, Acer Negundo, Fraxinus americana, Ceridiphyllum japonicum, Acanthopanax ricinifolium,* and *Albizzia Julibrissin.* The precipitation approaches 2 inches per month in June, July, and August; April has 8 and May 1 days of frost. The results are discouraging. The oaks suffered heavily from spring frost and are practically all dead; *Betula lutea, Acer Negundo,* and *Fraxinus americana* are failures, but *Betula odorata* and *B. Maximowiczii* are very promising.—*J. A. Larsen.*

1246. Hönlinger, H. **Zum Methodenstreit in der forstlichen Statik. [On the controversy over methods of forest statics.]** Centralbl. Gesam. Forstw. **46**: 100–111, 144–151. 1920.—The author concerns himself chiefly with a refutation of Dr. Neubauer's conception of the theory of highest interest on capital value of the forest (Reinertragslehre), which appeared in the above journal for 1918. The forest finance and mathematics of valuation formulae are analyzed in detail to prove the author's position.—*R. H. Weidman.*

1247. Huttanus. **Waldverwüstung. [Forest destruction.]** Deutsch. Forstzeitg. **36**: 157, 159. 1921.—Most of the forests near Cologne are in private hands, and practically all are being laid waste, with no provision for a future stand. Only strict state control of cuttings can save what remains.—*W. N. Sparhawk.*

1248. Jolyet, A. **Repeuplement artificiel dans une station de friche après exploitation à blanc étoc d'un peuplement de pin noir. [Artificial reforestation after clear cutting of black pine.]** Bull. Trimest. Soc. Forest. Franche-Comté et Belfort **13**: 273–277. 1920.—Black pine is better adapted than any other species to thin-soiled, calcareous wastes at low altitudes in eastern and northeastern France. Natural regeneration is, however, very difficult, and aritificial regeneration after each rotation very expensive. It is therefore suggested that clear cuttings, which are usually resorted to, be followed by the planting of Douglas fir (green variety), hornbeam, and black locust, with an occasional sycamore maple. Planting holes should be made in rows 1.5 m. apart each way. A Douglas fir should be planted in every 6th hole in every 6th row,—about 120 per hectare. In each of the other holes should be planted a tuft of 4 trees composed of 2 hornbeams and 2 locusts. A stand of this sort is well adapted to the site and will perpetuate itself indefinitely by a combination of sprouts and seedlings.—*S. T. Dana.*

1249. Judd, C. S. **Report of the Superintendent of Forestry.** Rept. Bd. Commissioners Agric. and Forest. Hawaii 1919–1920: 19–45. *Pl. 1–12.* 1921.—Emphasis is laid on the necessity of forest protection and forest extension (total of 71,641 trees of 37 species transplanted to 11 forest reserves throughout the Islands); methods of reducing fire menace; and Arbor Day activities.—*J. M. Westgate.*

1250. Kierulf, T. **Fra en skogtur i Normandie og litt om de Franske bögeskoge. [A trip to Normandy and a little about the French beech forests.]** Tidsskr. Skogbr. **29**: 10–22. *Pl. 1–7., fig. 1.* 1921.—The author presents a description of a 10,607 hectare beech and oak forest at Lyons, near Rouen, France, including silviculture and management.—*J. A. Larsen.*

1251. Kobayashi, J. **Paper making in Japan.** Amer. Forestry 27: 320–321. *2 fig.* 1921.

1252. Künkele. **Hilfstafel zur Zuwachserhebung.** [**Graphic chart for determining increment.**] Forstwiss. Centralbl. 43: 81–83. *Chart 1.* 1921.—A chart giving the per cent of increment of basal area, height, volume, and value of individual trees, is illustrated and discussed briefly. The determination of growth per cent of individual trees is particularly important now that silviculture is turning strongly toward the selection system.—*W. N. Sparhawk.*

1253. Kurth. **Fichtensaat oder -pflanzung?** [**Spruce seeding or planting?**] Deutsch. Forstzeitg. 36: 147. 1921.—Spruce stands grown from plantations do not, because of comparatively wide spacing, produce long slender poles, especially bean poles, which are in great demand. Therefore about 10 per cent of the area restocked with spruce each year should be seeded instead of planted.—*W. N. Sparhawk.*

1254. L. [Rev. of: Achterrath, Helmut. **Deutsche Rohholzwirtschaft während des Krieges und in der Übergangszeit.** (**German timber supply during the war and in the transition period.**) Frankfort.] Forstwiss Centralbl. 43: 29–30. 1921.—Achterrath discusses the timber situation before the war, measures adopted to insure supplies for the army and civil use during the war, and the outlook for the future, with especial reference to future sources of imports.—*W. N. Sparhawk.*

1255. Longville, A. **Logging by electricity.** Sci. Amer. 124: 285. *2 fig.* 1921.

1256. Mahood, S. A., and Eloise Gerry. **The production of American storax.** Druggists Circ. 65: 3–5. *Fig. 1–7.* 1921.—Experiments were carried on to find a supply of storax to take the place of Asiatic storax which was shut off by the World War. Collections of material for investigation were made from *Liquidambar styraciflua* growing near Elliott City, Louisiana, from June 10 to Nov. 14. Methods of tapping the trees and collecting the gum are described. Chemical analyses show that American storax compares very favorably with that of Asiatic origin. A microscopic examination of the wood shows that the storax is produced in the wood formed after the tree has been wounded. The yield of storax is in proportion to the number and size of the ducts thus developed.—*C. M. Sterling.*

1257. Miller, E. E. **Black locust reclaims washed lands.** Amer. Forestry 27: 252–253, 264. *4 fig.* 1921.

1258. Münch, Ernst. **Naturwissenschaftliche Grundlagen der Kiefernharznutzung.** [**Scientific bases of production of pine resin.**] Arbeit. Biol. Reichsanstalt Land- u. Forstw. 10: 1–140. *20 fig.* 1919.—The scarcity of naval stores in Germany during the war led to the utilization of the resin of *Pinus sylvestris* as a new industry. Münch attempts to place the technique of tapping on a scientific basis. The careful study comprises the following points: Microscopic structure of the resin duct; distribution and number of ducts with relation to width of annual ring; structure of the system of ducts throughout the bole; physiology and mechanics of the formation and flow of resin upon tapping; formation and rôle of pathological ducts; influence of climate, site, age, crown development of tree, method of tapping, and intervals between tapping on yield. The yield may vary up to 400 per cent. The possible yield per hectare per year is 1000–1250 kgr.—*E. P. Meinecke.*

1259. Neumann. **Die Kiefer-Dauerwaldwirtschaft.** [**The continuous management system with pine.**] Deutsch. Forstzeitg. 36: 189–193. 1921.—The author has visited the Barenthorn forest in Anhalt, where von Kalitsch has developed an original and highly successful method of silviculture. Stands are thinned every year, sometimes twice a year, beginning at 25 or 30 years of age, until about 10 seed trees per hectare are left. Logs are dragged out by horses, so as to loosen the soil and favor reproduction; because of the density of the latter, it does not matter that some seedlings are destroyed in removing the seed trees. All leaf litter and twigs are left on the ground to protect and enrich the soil. This method has resulted in most

excellent and thrifty reproduction of pine, has favored the increase in proportion of desirable hardwoods, such as beech, and has also resulted in a much more rapid height-growth of the pine than that in the neighboring forests managed by the old clear-cutting system. The method requires much more intensive work and can only be applied by technically trained foresters. By the use of this method vonKalitsch has increased the annual yield of his forest from 2.2 to 6.3 cubic meters per hectare.—*W. N. Sparhawk.*

1260. Opland, Evenby J. **Herredsskogmesterinstitutionen og dens betydning for et rationalt skogbruk. [The office of Herred Forester and its relation to a rational forest utilization.]** Tidsskr. Skogbr. **28**: 210–218. 1920.—The author lays stress on the fact that Norway will always receive much revenue from her forests, that the surest way of safeguarding the forests is by educating the people and by accumulating fundamental knowledge. Until this is assured there must be Government regulation and supervision, for which the office of Herred Forester has been instituted. It is the function of this office to supervise law enforcement, to insure that only properly informed persons prescribe the cuttings, that capable men are put in charge, and that the proper kind of information is gathered. About one-half of the country has now accepted this measure.—*J. A. Larsen.*

1261. Oppermann, A. **Tilvirkning og anvendelse af Dansk Gavntrae. [Sawing and utilization of Danish woods.]** Forst. Forsögsv. Danmark **5**: 301–342. *Fig. 1.* 1920.—The object of the investigation was to determine how dimensions, shape, and structure affect the amount and quality of the yield. To this end the different parts of the tree were selected in order to determine the sizes and the amounts which may be sawed out for stock to be used for staves, implement handles, shoe bottoms, wagons, etc.; also for lumber of different descriptions. The results of the investigations are given in great detail in tabular form.—*J. A. Larsen.*

1262. Orre, S. **Blinkning i Namdalen. [Marking in Namdalen.]** Tidsskr. Skogbr. **28**: 246–256. *Pl. 5.* 1920.—The author describes the results of early marking in the northernmost forests in Norway, and points out the bad results from unscientific marking. The forests are chiefly of spruce (*Picea excelsa*) and birch (*Betula odorata*).—*J. A. Larsen.*

1263. Pack, A. N. **Wooden shingles or substitutes.** Amer. Forestry **27**: 231–237. *13 fig.* 1921.

1264. Ramelow, A. D. **Nutzungen des Waldes unter besonderer Berücksichtigung der mit forstlichem Nebenbetriebe verbundenen landwirtschaftlichen Betriebe. [Uses of the forest with special regard to the relation between farm and forest management.]** Illus. Landw. Zeitg. **41**: 34–35. 1921.—The author gives a brief popular discussion of the utilization of the farm forest or wood-lot. Cut trees may be used for carriage poles, mine-timbers, sleepers, barrels, paper, poles, and facines; certain parts may be used for fire-wood and for local repairs. The forested tract may be used for pasture. Leafy twigs of poplars, aspens, willows, hornbeams, and other broad leaved trees, except alders, may be dried and used as fodder in winter, or the twigs only may be clipped off in winter and saved. Dried leaves, especially those of beech, may be used as bedding for animals. It is desirable to remove some of the beech leaves as they are usually so abundant as to interfere with reproduction.—*John W. Roberts.*

1265. Rave. **Forderungen zum Forstkulturgesetz. [Need for forest law.]** Zeitschr. Forst- u. Jagdw. **52**: 302–305. 1920.—The need for increasing forest production suggests the enactment of laws governing the management of forest land. All forests which do not show a satisfactory volume and value production should be placed under state supervision. The plan points toward the socialization of forests. The basis for the recommendation is the average yield per acre for 1913 of 187.4 cubic feet on State forests as against 89.3 in private forests.—*Joseph S. Illick.*

1266. Riemenschneider. **Die Holhspatenpflanzung bei der Fichte und der Hallimaschpilz. [Planting spruce with hollow spade and the "Hallimasch" fungus.]** Deutsch. Forst-

zeitg. 36: 165. 1921.—With this method of planting, losses due to the fungus *Agaricus melleus* are very much more serious than with the method of planting in prepared spots. The latter method also results in thriftier plants and more rapid height-growth, therefore is cheaper in the long run even though the first cost is greater. Douglas fir is most resistant to the fungus, followed by larch, white fir, pine, and spruce.—*W. N. Sparhawk.*

1267. Rubner. **Die Spätfroste und die Verbreitungsgrenzen unserer Waldbäume. [Late spring frosts and limits of distribution of forest trees.]** Forstwiss. Centralbl. 43: 41–49, 100–114. 1921.—The distribution of tree species is governed, with few exceptions, by their climatic and edaphic requirements and by their ability to compete with other species, depending on their tolerance, rate of growth, and longevity. No one factor can be designated as the decisive one, but, in the author's opinion, ability of a species to withstand late spring frosts is frequently of more importance than most other factors. The relative frost-hardiness of different trees depends upon the inherent hardiness of the species, upon the time when new growth begins, upon the ability to put out new shoots in case the first ones are killed, and also upon the form of the stand in which they occur. Topography is a very important factor because with it varies the probability of frosts, the period of new growth of a given species, and the amount of snowfall and its duration. Late frosts are the decisive factor governing both the horizontal and vertical distribution of a number of native and introduced species of central Europe. The distribution of Scotch pine, fir, spruce, birch, pedunculate and sessile oaks, ash, lindens, hornbeam, maple, and others is discussed.—*W. N. Sparhawk.*

1268. Ruden, Ivar. **Picea pungens. Dens anvendelighet i vort skogbruk. [Picea pungens and its suitability for use in Norwegian forestry.]** Tidsskr. Skogbr. 29: 39–47. 1921.—The Colorado blue spruce plantations in Norway show promise that the species will help solve the problem of extending the timberline northward and upward where native trees do not thrive. It may also be used to advantage on the poorer wind-swept sites near the coast. The plantations are now from 13 to 20 years old and are everywhere on precarious sites superior to the other species.—*J. A. Larsen.*

1269. S[chüpfer]. **Die Nadelholzwälder der Welt und die Aussichten der Holzwarenindustrie. [The coniferous forests of the world and the outlook for wood manufacturing industries.]** Forstwiss. Centralbl. 43: 152–154. 1921.—Modern civilization, more than any previous one, depends on timber supplies. Wood, and especially coniferous wood, has become one of the great staple articles of world trade. Conifer forests are largely confined to the northern hemisphere, and the greatest areas are in the Scandinavian region and in North America, the great eastern white-pine forests of the latter being exhausted. The Canadian forests are extensive but very poorly stocked, due to forest fires. The southern pine forests are enormous, but are being cut very rapidly. Within a short period, British Columbia will be the greatest center of the world's lumber industry, and the American Pacific coast will be the only serious competitor of Finland and Sweden. Suggestions that Siberia will become an important factor should not be taken seriously. Austria-Hungary is not a factor and much of European Russia's large forests are economically inaccessible. The conclusion is that the world's supplies of economically exploitable softwoods are much more limited than has been generally believed and that it is necessary not only to exploit what remains but also to grow more.—*W. N. Sparhawk.*

1270. Schüpfer. [Rev. of: Schwappach, Adam. **Mitteilungen aus den forstlichen Versuchswesen Preussens. Untersuchungen über die Zuwachsleistungen von Eichenhochwaldbeständen in Preussen.** Zweiter Teil. (1906–1919). **(Growth of oak stands in Prussia.)** J. Neumann: Neudamm, 1920.] Forstwiss. Centralbl. 43: 192–194. 1921.—Schwappach's oak yield tables of 1905 were based on single measurements of a large number of sample plots of various ages, and therefore give only approximate values. Since then the plots have been remeasured, and curves constructed on the basis of the actual growth on them. The new height curves rise considerably above the old ones, but the basal area and volume curves do not because, with the silvicultural methods best adapted to oak,

—light thinnings in youth, followed by heavier ones,—the basal area increases very little after about the 100th year. The volume curves of 1920 at the 200-year point are considerably below those of 1905, due principally to the fact that a much greater volume is removed in thinnings than was shown by the earlier curves. The total increment, including thinnings, is not very different. The value-increment is probably considerably greater with the heavy thinnings. The question as to the most effective kind and density of understory under the oak is not yet answered.—*W. N. Sparhawk.*

1271. SEEHOLZER. **Die Naturverjüngung auf den Juraböden der Oberpfalz. [Natural reproduction on the Jura of upper Palatinate.]** Forstwiss. Centralbl. 43: 6–18. 1921.—In this region, natural reproduction is much safer and more certain in producing a valuable stand than artificial reproduction, either by seeding or planting. The climate is rather dry, periods of drought are not uncommon, and the soil dries out and heats very quickly if exposed to the sun. It is necessary, therefore, to use a silvicultural system which will conserve moisture and at the same time prevent undue root competition between seedlings or between seedlings and old trees. The system used must also favor abundant seed reproduction, must maintain the soil in such condition that seeds will germinate and the seedlings establish themselves, and must retain the mixed form of stand,—spruce with from 10 to 50 per cent of beech, fir, and pine, according to local conditions. These requirements are best met by the selection system, occasionally using the strip selection method, and being careful to keep openings rather small. Cuttings should in most cases proceed regularly from the north side of the stand toward the south, in order to conserve moisture. Since the application of the system varies with each variation in local conditions, it requires a very intensive control by a trained forester.—*W. N. Sparhawk.*

1272. SIM, T. R. **Timber trees for commercial culture. Further species that have been tried in South Africa.** South African Jour. Indust. 4: 161–165. 1921.

1273. SIM, T. R. **Tree planting for the farm. I. Selecting the site for the plantation.** South African Jour. Indust. 4: 218–223. 1921.

1274. SKÖIEN, OLAF. **Antal aar paa sidste Cm. [The number of years' growth on the last centimeter of radius.]** Tidsskr. Skogbr. 28: 223–227. 1920.—Mistakes and errors which result from the use of SCHNEIDER'S formula are pointed out. Measurements on rapidly growing trees will give a very short period as compared with the slower growing trees and those on poor sites. Irregularities in the periodic growth are thereby overlooked and the arithmetical means of the number of years in the last centimeter on the radius for trees in the same diameter class introduce other errors. The use of the distance for each ten years' growth overcomes these difficulties.—*J. A. Larsen.*

1275. STANG, THOMAS. **Vest-Amerikanske traeslag for Norges Skogbruk. [West American trees for use in Norway.]** Tidsskr. Skogbr. 28: 257–277. *Pl. 1–8., fig. 1–3.* 1920.

1276. VANDERYST, HYAC. **Contributions à l'étude du palmier à huile au Congo belge: 5°. La récolte des produits de l'Elaeis. [Contributions to the study of the oil palm in Belgian Congo: 5. The collection of the products of Elaeis.]** Bull. Agric. Congo Belge 11: 22–36. *Fig. 5–8.* 1920.—*Elaeis* is one of the most useful trees of the Congo. The natives collect the sap, which by spontaneous fermentation is transformed into a more or less alcoholic drink known as Malafu, or palm wine; the leaves are used for basket work and the fruits furnish oils of great value. The methods employed by the natives in collecting these products are discussed, and the danger incurred by them of contracting sleeping sickness.—*E. M. Doidge.*

1277. VANDERYST, HYAC. **Contributions à l'étude du palmier à huile au Congo belge: 6°. Le tronc ou stipe de l'Elaeis. [Contributions to the study of the oil palm in Belgian Congo: 6. The trunk of Elaeis.]** Bull. Agric. Congo Belge 11: 37–53. *Fig. 9–12.* 1920.—In the neighborhood of the mission at Leverville the trunk of *Elaeis* attains an average diameter of 33.6

cm., which is in excess of the average diameter assigned to it by other writers; the maximum observed was 36.7 and the minimum 28.8 cm. A diameter less than 25 cm. has not been observed. Other things being equal, *Elaeis* develops better and more vigorously on a pronounced slope than on a slight slope or on flat ground.—*E. M. Doidge.*

1278. VENDELMANS, H. **Making a forest to order.** Sci. Amer. 124: 232, 240. *4 fig.* 1921.—A method of forestry by preculture, as practiced in Europe, is described. The method consists of preparing the land, improving and appropriating it to the intended tree planting, which is then executed at the lowest possible cost. It aims to destroy the natural vegetation, to break up and aerate the soil and insure drainage, to improve the soil and add to its mineral content by applying lime and chemicals, to improve further its physical condition by increasing the power for retaining water, to enrich it with available nitrogen and with a bacterial flora by using green manures, and to make the agricultural crop which follows the green manure pay for the expenses and provide an appropriate medium in which to plant at small cost with the maximum percentage of growth.—*Chas. H. Otis.*

1279. VIKHAMMER, P. **Granfro i Troms Fylke. [Spruce (Picea excelsa) seed in the Troms district.]** Tidsskr. Skogbr. 28: 218–220. 1920.—Tests were made of the number of seed per cone, germination per cent, and number of young trees per cone of Norway spruce at the northern limit of its distribution (69° 21′ north latitude in Norway). There were from 85 to 164 seeds per cone, a germination of from 5.7 to 34.2 per cent, and from 0 to 10 plants per cone.—*J. A. Larsen.*

1280. WEBER, HEINRICH. **Die deutsche Holzbewirtschaftung während des Weltkrieges. [Handling of German wood supply during the World War.]** Allg. Forst- u. Jagdzeitg. 95: 89–99. 1919.—A complete review of the German wood supply situation during the World War is presented. Germany has been a wood-importing country since 1870. At the outbreak of the war 15 million cubic meters of wood were imported to meet the demands of industries. The German forests in 1913 produced 28.66 million cubic meters of work wood, the consumption of work wood being 43 million. The imported wood came from Russia (52.5 per cent) Austria-Hungary (27.6 per cent), Norway and Sweden (7.3 per cent), U. S. A. (7.1 per cent), and Finland (3.1 per cent). The enemy blockade was so complete and effective that practically all importation ceased. It became necessary to meet all demands from the forests at home and in occupied territory. This compulsory transfer of operations meant a complete reorganization of the wood-supply equipment. In order to meet the situation, there was created a division of raw material in the Department of War. This sufficed for the first 2 years of the war when most of the wood was obtained from the enemy forests in occupied territory. Much wood was obtained from the territory occupied by the army of the East. In the summer of 1916 a marked change took place in the conduct of the war. Excessive demands came from all sides for many different forest products. The situation became so critical that a central organization had to be created. Soon it was divided into 2 sections, and by 1917 there were 7 separate sections each with a distinct line of work. Three periods of development in satisfying the wood-supply of the German army are recognized, (1) from the beginning of the war to the spring of 1916, (2) from the spring of 1916 to December 1916, and (3) from December 1916 to the end of the war. Special modifications of cutting and logging methods were ordered and in spite of the heavy drain upon the forests the latter remain in a fairly good condition.—*Joseph S. Illick.*

1281. WEBSTER, A. D. **Brown oak timber.** Gard. Chron. 69: 164. 1921.—This is a strictly English product confined to the midland and eastern counties. The best timber has been sent to America for thin veneers, 30–40 to the inch, on account of its great value. The dining room of the White House at Washington is entirely panelled with it. The cause of the change in color from white to a rich brown or chestnut is uncertain but is generally ascribed to certain properties in the soil. The use of the wood for panelling has been known from early Tudor times, although only since William the Stadholder came from Holland in 1685 has the most decorative method of wall panelling been adopted. Previous to that time

and up to the Jacobean period panels were small. The best English examples of the early use of this timber are found in the Royal Chapel and Banqueting Hall in the Tower of London, St. Paul's Cathedral (from Welveck in 1695), and the Cloister of Durham Cathedral.—*P. L. Ricker.*

1282. Webster, A. D. **Lumbering in British Columbia.** Gard. Chron. 69: 126. 1921.—A report of a 3-weeks' visit to the lumbering camps is presented, including a brief description of the camps and operating and transportation methods.—*P. L. Ricker.*

1283. Whitford, H. N. **Tropical forests.** Sci. Amer. Monthly 3: 267–270. 1921.

1284. Wild, A. D. **Wie der Nordsaumplenterschlag sich von selbst einführte und sonstiges aus dem Revier Zabern. [How the north-border-selection cutting originated and other notes from the Zabern district.]** Forstwiss. Centralbl. 43: 161–172. *1 pl.* 1921.—Wild discusses the history of the forests of the Zabern district, which are composed of a considerable variety of stands, including oak, beech, fir, spruce, and pine, pure and in various mixtures. Various silvicultural methods are used, but different forms of selection cutting, with natural reproduction, predominate.—*W. N. Sparhawk.*

1285. Wimmer. [Rev. of: Rebmann. **Der Anbau von Walnussbäumen und amerikanischen Nussbaumarten im Walde. (Growing walnut trees and American nut trees in the forest.)** *68 p., 4 fig.* J. Neumann: Neudamm, 1920.] Forstwiss. Centralbl. 43: 191-192. 1920.—This is a very thorough and careful treatise on the cultivation of *Juglans regia, J. nigra, J. cinerea, Carya alba, C. porcina,* and *C. tomentosa* by a forester who has studied these species for decades.—*W. N. Sparhawk.*

1286. Zeller. **Ansichten über Buchenverjüngungen. [Notes on reproduction of beech.]** Deutsch. Forstzeitg. 36: 140–142. 1921.—The author's experience indicates that cuttings in beech forests can be made every year, without reference to the occurrence of moist years, and that satisfactory beech reproduction will follow in due time. He believes that young beech seedlings do not need overhead shade,—that they are more thrifty without it.—*W. N. Sparhawk.*

GENETICS

George H. Shull, *Editor*
James P. Kelly, *Assistant Editor*

(See also in this issue Entries 1112, 1125, 1127, 1153, 1176, 1392, 1405, 1410, 1424, 1468, 1553, 1646)

1287. Anonymous. **Ratio of sires and dams.** U. S. Dept. Agric. Weekly News Letter 8: 8. 1920.—A tabulation of more than 200,000 head of stock kept for breeding purposes on more than 2000 representative farms gave the following average number of females to each male: Cattle 18.9, horses 16.9, swine 11.5, sheep 37, goats 26.6, chickens 23.3, other poultry (geese, ducks, turkeys) 8.5.—*Sewall Wright.*

1288. Anonymous. [Rev. of: Chevalier, A. **Sur l'origine des pommiers à cidre cultivés en Normandie et en Bretagne. (On the origin of cider apples cultivated in Normandy and Brittany.)** Compt. Rend. Acad. Sci. Paris 171: 521–523. 1920 (see Bot. Absts. 8, Entry 377; 9, Entry 1311).] Gard. Chron. 68: 223. 1920.

1289. Anonymous. **Dwarf maize.** [Rev. of: Kempton, J. H. **A brachytic variation in maize.** U. S. Dept. Agric. Bull. 925. *28 p., 19 pl., 8 fig.* 1921 (see Bot. Absts. 8, Entry 1923).] Gard. Chron. 69: 254. 1921.

1290. Åkerman, Å. **Untersuchungen über Bastarde zwischen Epilobium hirsutum und Epilobium montanum. [Investigations on hybrids between Epilobium hirsutum and Epilobium**

montanum.] Hereditas 2: 99–112. *8 fig.* 1921.—Hybrids between species of *Epilobium* have been reported as occurring among wild plants and are frequently referred to in systematic literature. In such cases it is difficult to determine, from field observations, what the parent species are in particular cases. Artificially controlled hybrids have been produced between *E. hirsutum* × *E. montanum* by Compton. Lehmann has produced hybrids by crossing *E. parviflorum* with 3 other species. Reciprocal crosses were different in a number of characters. When *E. parviflorum* was used as female parent the hybrid was quite sterile, no good pollen being produced, while the reciprocal cross produced about 50 per cent good pollen and some mature seed. There were other reciprocal differences. In the F_2 generation obtained from *E. palustre* × *E. parviflorum* a large range of independently segregating characters was obtained. The author made reciprocal crosses between *E. hirsutum* and *E. montanum.* Plants of the parent species were grown simultaneously. At the flowering stage the *E. montanum* plants were 60–70 cm. tall while the adjacent F_1 hybrids were dwarfs, about $\frac{1}{2}$–$\frac{1}{4}$ as tall and considerably smaller than the smaller parent. The hybrids in other respects were a reproduction of the *E. montanum* plants, with no evidence of the *E. hirsutum* parent. The adjacent parent species grew and flowered normally while the dwarf F_1 plants failed to produce flowers. Now and then F_1 plants more robust than the others appeared, on which the buds reached a higher stage of development than was generally the case. Compton, reporting on this cross, noted the same peculiarities. The reciprocal cross, *E. montanum* × *E. hirsutum,* produced F_1 plants of the more vigorous, robust type only. Of the 1919 cultures some of the potted plants were placed in the shade of a tree to prevent too rapid loss of moisture. The stems of these plants grew much more rapidly than the remainder left in the open garden. A more nearly normal development ensued and a few flowers opened, on which the petals were larger than those on the parent. Following this, specimens of hybrids and parents were placed in the north window of the laboratory where the hybrids developed much more rapidly than those left in the garden. The flowers opened completely, the petals resembling those of *E. hirsutum.* In 1920 this experiment was repeated with the same results. The author was unable under these conditions to distinguish reciprocal hybrids. Excessive and scant water supply to shaded plants and to plants in sunlight did not alter the results, indicating that the better development of the shaded hybrids was due to reduced illumination. Backcrosses of these F_1 plants to the parents produced abundant seed, which, however, produced only a few seedlings, many of which were weak and soon died as was true of some in the F_2, *E. palustre* × *E. parviflorum,* reported by Lehmann. Approximately 100 plants of the backcross remained alive and showed a large range of variations and character combinations which does not indicate close linkage of genes. Attempts to find a bacterium as the cause for the dwarfing in F_1 gave negative results. Results show a distinct difference between the *E. montanum* × *E. hirsutum* hybrid produced artificially and the wild form of *Epilobium* supposed to be the field hybrid between these 2 species.—*J. L. Collins.*

1291. Alderman, W. H. **Experimental work on self-sterility of the apple.** Proc. Amer. Soc. Hort. Sci. 14: 94–101. 1917 [1918].—The investigation was begun in 1912. Previous investigation in apple pollination and sterility consisted mainly in studies of bloom clusters enclosed in paper sacks and, for cross-fertilization, emasculation had usually been practiced. Four possible sources of error enter into such tests: (1) Temperature and humidity conditions within paper sacks are abnormal; (2) individual flowers or clusters of flowers were studied without regard to the remainder of the tree; (3) emasculation may produce a decidedly abnormal condition; (4) it has not been shown that pollen from other trees of the same variety may not prove effective even though a single flower or single tree is self-sterile within itself. To eliminate these possible sources of error whole trees were enclosed in cheese-cloth or muslin frames.—The temperature was less variable within the muslin-covered frames than without, being 1–2 degrees higher at night and 2–4 degrees lower on bright days; on cloudy days there was very little difference. The humidity was slightly higher within the frames. In a comparison between muslin-covered frames and paper bags, the latter gave the better results. A summary of 3 years' work with Rome Beauty, York Imperial, and Wagener using pollen from another tree of the same variety shows no advantage over the use of pollen from the same tree.

Normally, not as large a percentage of blooms set fruit in Rome Beauty as in Wagener or York Imperial. Under orchard conditions the set in Rome Beauty is 4.46 per cent, whereas in York Imperial it is 7.87 and in Wagener 8.50.—The relative sterility of 2 varieties may not be judged by a direct comparison of the percentage of fruit set on each, but rather by a comparison of such set of fruit to the normal set of the variety. In the same way the efficiency of a mutual pollenizer may not be judged by a direct comparison of its effects upon 2 varieties, but rather by a comparison to the normal set of each. While none of the varieties given in the table are entirely self-sterile, they are greatly benefited by cross-fertilization. For Rome Beauty the percentage of set was increased 3½ times, York Imperial 14 times, and Wagener 7 times. The size of individual fruits was increased by crossing; for Rome Beauty the increase over the size of self-pollinated fruits was 27.8 per cent, and for York Imperial 42.7 per cent. In 1914 and 1915 tests the set of fruit from emasculated buds was more than double that from buds not emasculated. Leaving calyx and corolla intact, removing corolla only, or removing both calyx and corolla appeared to make no difference in the results. The probable explanation of increased activity in emasculated blooms may be found in the protection it affords against superabundant pollination by the blooms' own pollen. Probably self-pollination frequently occurs naturally before artificial cross-pollination is brought about. Tubes of foreign pollen must then compete with tubes of the flowers' own pollen, with the result that chances of cross-fertilization are lessened.—A table of seed production shows that there are from 2 to 6 times as many seeds in the crossed fruits as in the selfed ones.—The possible presence of toxic secretions from stigmas was investigated, over 200 tests being made in which pollen of several varieties was germinated in stigmatic extracts from the same variety or other varieties. No toxic action was discovered. Thus it is evident that sterility is not a result of inhibition of pollen germination by toxins.—In a 1915 test of the value of cross-fertilization 6 hives of bees were placed in a section of a Rome Beauty orchard, and blooming branches of other varieties were fastened upright in pails of water suspended in the trees; 16 trees were observed. At some distance 16 similar trees were used as a check. The bee section produced more than twice as much fruit as did the check section, indicating clearly the value of bees in an orchard. The bee plat more thoroughly self-fertilized than the rest of the orchard would probably have shown some gain, but it is believed that the gain was due primarily to the cross-fertilization that must have taken place.—*C. S. Crandall.*

1292. Altenburg, Edgar. **Interference in Primula sinensis.** Amer. Nat. **55**: 78–80. 1921.—Upon recalculating the linkage data presented in a former paper (Genetics **1**: 354–366. 1916), the writer finds, by correcting an error of calculation, that they indicate interference of about the same degree as found in *Drosophila*. Only plants with red stigmas were used in this calculation. The total crossing over in the 2 regions was 11.2 and 36.6 per cent; observed double crossovers, 2.9 per cent; coincidence, 2.9÷4.1, or 0.7; total number of individuals, 1876.—*E. G. Anderson.*

1293. Auchter, E. C. **A preliminary report on apple and pear breeding in Maryland.** Proc. Amer. Soc. Hort. Sci. **17**: 19–32. 1920 [1921].—Pear crosses were made in 1905 and in each succeeding year, except 1915, to and including 1917. The aggregate of seedlings grown was 1368, representing 10 of the 12 years. Ten varieties appear as parents in 28 crosses representing 17 parental combinations. Kieffer was the female parent in 10 crosses, for which 5 varieties supplied pollen, and served as the male parent in 8 crosses on 4 varieties. The report of results is deferred pending fruiting of the seedlings.—Apple crosses were made in each of the 12 years 1906–1917. Sixteen crosses of 1910–1911 yielded no seedlings. The 827 seedlings grown represent 22 varieties used as parents in 17 combinations in 45 crosses. This report considers 166 seedlings, from the crosses of early apples in 1907, that have fruited; they represent 11 parental combinations. A table gives, for each group, flowers pollinated, fruits picked, seed production, seedlings transplanted, number fruited, number dead, and number not yet fruited. It appears that 2940 pollinations gave 334 fruits,—11.36 per cent of the pollinations successful. The average seed content was 4.57. Germination of seeds of the different groups ranged from 0 per cent for 5 seeds from the cross Early Ripe × Williams, to 92.73 per cent for

the cross Williams × Early Ripe. The average percentage of germination for all groups was 47.31. Of the 493 seedlings, 459, or 93.1 per cent, were permanently planted and of these 425 are living at the end of the 13th year; they represent 86.2 per cent of the germinations and 92.6 per cent of the seedlings permanently planted.—A 2nd table gives details of fruit descriptions, showing distribution as to form, size, color, flavor, and season. Regarding shape and length, illustrations are drawn from the table showing "that it was not so much a matter of either parent transmitting most of its characters, but that rather certain factors or characters in certain varieties were the dominant ones and were transmitted regardless of which parent the certain variety happened to be." Critical study of color transmission is deferred, "but in general it can be seen that the factor or factors which carry color (red, pink, or carmine) are dominant over the factor or factors carrying yellow." "In this case again the fact that red color seems to be dominant, appears to be more important and significant than the question of whether the male or female parent is the more prepotent in this respect." Of 19 seedlings from 2 yellow parents,—Yellow Transparent × Early Ripe,—1 bore a red-striped fruit and 1 a solid red fruit indicating that the parents, one or both, are heterozygous for color.—None of the parent varieties bear sweet fruits, but several seedlings with sweet fruits appear in several crosses. "These are not very numerous, however, and probably the factors carrying sweetness are recessive. In nearly every case there are higher percentages of acid to sub-acid fruits than there are of mild sub-acid or nearly sweet. This holds again regardless of which parent is the male or female and suggests that the factor or factors which carry acid or sub-acid are dominant over those carrying mild sub-acid or nearly sweet flavor."—"The range of the ripening period did not extend over two weeks on either side of the ripening period of the parents and, in general, most of the seedlings of a certain cross ripened during the same period as the parents."—Of the 166 seedlings 24, from 6 crosses, are recorded as very promising, and 11 additional ones, from 3 of these crosses, are reserved for further testing. The very promising seedlings are: Yellow Transparent × Williams, 6 of 29; Yellow Transparent × Red June, 2 of 14; Yellow Transparent × Early Ripe, 1 of 19; Williams × Early Ripe, 4 of 35; Williams × Yellow Transparent, 10 of 51; and Early Ripe × Yellow Transparent, 1 of 13.—In 1907 seedlings from open-pollinated fruits were grown as follows: From Yellow Transparent 148, Williams 89, and Early Ripe 9. Ninety of these had fruited and 1 each from Yellow Transparent and Williams were recorded as promising. [See also Bot. Absts. 9, Entry 785.]—*C. S. Crandall.*

1294. BABCOCK, E. B. **Bud selection and the frequency of mutations.** Proc. Amer. Soc. Hort. Sci. 17: 40–44. 1920 [1921]. Bud variations in horticultural plants are discussed and it is pointed out that very little is known concerning the frequency of their occurrence. Both species and varieties, however, are known to differ in regard to the frequency with which bud mutations occur, and therefore it may be expected that more variations will occur in certain fruit trees like the citrus than in the deciduous fruits. Examples are given of plants which produce frequent mutations and of those which produce few or no mutations; the bearing of the *Drosophila* investigations on the subject of bud mutations is briefly discussed. In closing the writer discusses the tendency of nurserymen to advertise stock grown from known high producers without experimental proof as to their superiority, and advocates the carrying on of more experimental work in this field.—*Richard Wellington.*

1295. BABCOCK, E. B., AND J. L. COLLINS. **Interspecific hybrids in Crepis. I. Crepis capillaris (L.) Wallr. × C. tectorum L.** Proc. Nation. Acad. Sci. 6: 670–673. 1920.—*Crepis tectorum* has 4 pairs of chromosomes, while *C. capillaris* has 3 pairs; the F_1 hybrids have 7 chromosomes. Forty of these hybrids were raised as seedlings. None produced true leaves, but they remained for months in the cotyledonary stage before perishing; the tissues were found to be in a chaotic condition.—*John Belling.*

1296. BALTZER. [German rev. of: HERTWIG, PAULA. **Abweichende Form der Parthenogenese bei einer Mutation von Rhabditis pellio. Eine experimentelle cytologische Untersuchung. (Aberrant form of parthenogenesis in a mutation of Rhabditis pellio. An experimental cytological study.)** Arch. Mikrosk. Anat. 94: 303–337. 1920.] Zeitschr. Indukt. Abstamm.- u. Vererb 25: 254–255. 1921.

1297. Baltzer. [German rev. of: Hertwig, Paula. **Haploide und diploide Parthenogenese. (Haploid and diploid parthenogenesis.)** Biol. Centralbl. 40: 145–174. 1920 (see Bot. Absts. 6, Entry 1695).] Zeitschr. Indukt. Abstamm.- u. Vererb. 26: 180–181. 1921.

1298. Baltzer. [German rev. of: Levy, Fritz. **Die Kernverhältnisse bei parthenogenetischen Fröschen. Ein Beitrag zur Physiologie und Pathologie der Zelle. (The nuclear relations in parthenogenetic frogs. A contribution to the physiology and pathology of the cell.)** Sitzungsber. Preuss. Akad. Wiss. Berlin 1920: 417–425. 1920.] Zeitschr. Indukt. Abstamm.- u. Vererb. 26: 181–182. 1921.

1299. Barker, E. E. **Relacion existente entre el cruzamiento de plantas y la agricultura. [The relation existing between crossing of plants and agriculture.]** Rev. Agric. Puerto Rico 5: 4–12. 1920.—A brief sketch is presented of the development of genetics and its practical application to plant breeding problems with suggestions for specific application to Porto Rican problems.—*E. E. Barker.*

1300. Bateson, W. **Genetic segregation.** Amer. Nat. 55: 5–19. 1921.—There is a large group of cases in plants in which the reduction division cannot be coincident with segregation.—(1) In *Matthiola,* all the pollen-grains of the double-throwing singles carry the factor for double, while some of the egg-cells have the factor for single, others the factor for double. The same is the case, *mutatis mutandis,* with the factors for white and cream petals. The pollen-grains are uniformly sound.—(2) A comparable difference between pollen and egg-cells has been demonstrated in Oenotheras, though here there are many empty pollen-grains.—(3) In *Campanula carpatica,* all the pollen-grains of a certain hermaphrodite plant, heterozygous for blue flower, carry the factor for femaleness; and more of them carry also the factor for white flower. The pollen-grains are sound.—(4) In heterozygous single Petunias, all the pollen-grains carry the dominant factor for singleness; the pollen-grains are sound.—(5) *Begonia Davisii* is a wild form with single flowers. All the pollen-grains carry the factor for double flowers. The pollen gives all doubles when used on double varieties; single is dominant. These pollen-grains are sound.—(6) A recessive strain of *Linum usitatissimum,* from a cross, had anthers with only occasionally a few good pollen-grains. Pollinated from 3 other varieties of flax, only recessives were produced. Thus these 3 flaxes were heterozygous for the factor in question, and all their pollen bore the recessive factor.—(7) A difference in the linkage value for the microspores and megaspores of *Primula sinensis* is due to somatic segregation.—(8) The production of certain periclinal chimeras is due to somatic segregation.—(9) In crosses of rogue peas with the normal forms, the factors peculiar to the normal form are left behind in the lower parts of the F_1 plants, the upper parts being pure rogue.—(10) In *Funaria hygrometrica,* from the perigonial leaves around the antheridia, plants bearing only antheridia were regenerated; while regenerations from leaves surrounding the archegonia produced monoecious plants only. Thus somatic segregation can occur even in a haploid form.—(11) A variegated *Adiantum capillus-Veneris* produced only green prothallia. The young ferns raised from these prothallia were green, white, or variegated. Hence somatic segregation must have occurred in the haploid tissue of the prothallia.—*John Belling.*

1301. Baur, E. [German rev. of: Hagem, Oscar. **Arvelighets-Forskning. En oversigt over nyere resultater. (Genetical investigation. A review of new results.)** *317 p.* Ashehoug & Cie.: Kristiania, 1919.] Zeitschr. Indukt. Abstamm.- u. Vererb. 26: 254. 1921.

1302. Baur, E. [German rev. of: Kronacher, C. **Allgemeine Tierzucht. Zweite Abteilung. Fortpflanzung-Variation und Selektion-Vererbung. Zweite, vermehrte und durchgearbeitete Auflage. (General animal breeding. 2nd part. Reproduction-variation and selection-heredity. Second enlarged and completely revised edition.)** Parey: Berlin, 1920.] Zeitschr. Indukt. Abstamm.- u. Vererb. 26: 176. 1921.

1303. Baur, E. [German rev. of: Reinke, J. **Kritik der Abstammungslehre. (Critique of the evolution theory.)** *133 p.* Johann Ambrosius Barth: Leipzig, 1920.] Zeitschr. Indukt. Abstamm.- u. Vererb. 26: 178–179. 1921.

1304. BEACH, S. A. **Fruit breeding in the northwest and its significance in horticultural development.** Proc. Amer. Soc. Hort. Sci. 17: 13–19. 1920 [1921]. A general discussion is presented.—*J. P. Shelton.*

1305. BEMMELEN, J. F. VAN. **Das Farbenmuster der mimetischen Schmetterlinge.** [The color pattern of mimetic butterflies.] Zool. Anzeiger 52: 269–277. 1921.—The author says that one should be unprejudiced by the "mimicry hypothesis." Each group of animals must be considered by itself from the point of view of comparative morphology. The same evolutionary tendencies underlie evanescence or modification of color pattern in different families and this produces forms with superficial resemblances. The more usual character in a group is not necessarily the more ancestral; the 2 genera of monotremes are not derived from other mammals. Narrow "mimetic" wing and body occurs in several different families of butterflies, showing that hereditary fundaments for this character are present in all. "Mimicry" once appearing may be of survival value, but natural selection is not a creative force. The loss of tails in females of *Papilio* is atavistic, for ancestral Lepidoptera have no tails. Females are more primitive although English writers regard "mimetic" females of *P. dardanus* as departures from the ancestral type produced by natural selection to resemble Danaids of the particular region in which they occur. Sex differences are not fundamentally different from other types of variation within species.—*P. W. Whiting.*

1306. BREITENBECHER, J. K. **The genetic evidence of a multiple (triple) allelomorph system in Bruchus and its relation to sex-limited inheritance.** Genetics 6: 65–90. 1921.—The author finds 4 types of the "four-spotted cowpea-weevil," *Bruchus maculatus*, Fabr., distinguished in the females by the body-colors, on the elytra and elsewhere, of red, black, white, and tan. In males, the color distinctions are not sufficiently marked to make the separation by the eye practicable in genetic experiments. Tan, which in females is the usual color of the wild beetles, is, in general, the color of all males. Sex-linked inheritance is not shown; on the other hand, sex-limited inheritance is as just explained. The "mutants," as the author terms all but the tan type of female, have frequently been found in cultures from various parts of the U. S. A. Each type is described. Each color is determined by a gene allelomorphic to each of the other color-genes, making a multiple allelomorphic group of 4. This is demonstrated by 69 different matings, producing over 100,000 individuals. The order of dominance is red (dominant to all), black, white, tan; order of greatest fertility and vigor, black, red, tan, white; order of greatest size, black, tan, red, white. "There is a marked variation as regards color. . . .For the whites may approach the blacks and the reds may verge on the whites as well as on the tans."—*John S. Dexter.*

1307. BUCHANAN, J. ARTHUR. **The Mendelianism of migraine.** Med. Rec. 98: 807–808. 1920.—Heredity is defined in the Mendelian sense as applied to a disease and it is shown that migraine conforms to the definition. The material for the study was obtained at the Mayo Clinic and included 127 families with a total of 808 children. When both parents are migrainous all the children have migraine. When neither parent is migrainous but is of migrainous stock or if 1 parent only is migrainous, migraine appears among the children approximately in the ratio of 1:3. "There is no medication known that will alter" the course of the disease; "it is a distinct part of the patient's economy."—*Howard J. Banker.*

1308. BURCH, D. S. **Pure-bred sires lead rapidly to improvement in female stock.** Jour. Heredity 12: 45–48. *Fig. 32–34.* 1921.—The author describes results of the "Better sires—better stock" campaign of the Department of Agriculture [U. S. A.]. There has been a distinct increase in the ownership of pure-bred females among those enrolled in the campaign.—*Sewall Wright.*

1309. BURGEFF, H. **Sexualität und Parasitismus bei Mucorineen.** [Sexuality and parasitism in the Mucorineae.] Ber. Deutsch. Bot. Ges. 38: 318–328. 1921.—The author reviews his previous work on the Mucor parasite *Chaetocladium*, in which he showed the gall cell to be a mixture of protoplasm and nuclei of parasite and host, and in which he suggested that the

parasitism of *Chaetocladium* was related to the sexual process and had arisen as an attempt at hybridization. New data in support of this view are furnished by the Mucor parasite *Parasitella simplex*, of which the author has isolated the (+) and (−) races and obtained the zygospores. The formation of the gall cell is essentially similar to the process in *Chaetocladium*, except that in *Parasitella* the gall cell formed by a mixture of protoplasm of parasite and host becomes a storage organ in the form of a thick-walled body resembling an azygospore. Both (+) and (−) races of *Parasitella* parasitize both (+) and (−) races of most Mucor species, such as *Rhizopus nigricans*, *Mucor Mucedo*, and *M. heimalis*. *Parasitella* (+), however, parasitizes only the (−) race of *Absidia glauca*, and *Parasitella* (−) only the (+) race of this *Absidia*. A (−) race of *Chaetocladium* parasitizes only the (+) race of the same *Absidia* while parasitizing both (+) and (−) races of *Rhizopus* and *Mucor*. It is concluded that the hypothetical sexual substance which distinguishes the (+) and (−) mycelia of *Absidia* is in this case identical with the substance which induces parasitism; and that the parasitism of *Chaetocladium* and *Parasitella* is sex-limited in respect to *Absidia glauca*, but is not sex-limited in respect to *Rhizopus* and other genera. From the foregoing and from the fact that the (+) and (−) races of *Rhizopus* show imperfect hybridization reactions with the opposite sexes of *Absidia* it is further concluded that *Rhizopus* and *Absidia* possess like sexual complements but that *Rhizopus* has a special complement in addition which completes the sexual and parasitic complements of *Parasitella* (+) and *Parasitella* (−) and brings them into activity.—*A. F. Blakeslee.*

1310. CASTLE, W. E. **A new type of inheritance.** [Rev. of: SCHMIDT, JOHS. **Racial investigations. IV. The genetic behavior of a secondary sexual character.** Compt. Rend. Trav. Carlsberg Lab. 14^{8}: 1–21. *Color pl. 1–5.* 1920.] Science 53: 339–342. 1921.

1311. CHEVALIER, A. **Sur l'origine des pommiers à cidre cultivés en Normandie et en Bretagne.** [On the origin of cider apples cultivated in Normandy and Brittany.] Compt. Rend. Acad. Sci. Paris 171: 521–523. 1920.—For northwest France there have been described 500 to 1000 varieties of cider apples. The origin of these apples is not well known. It was formerly held that there was but a single Linnaean species, *Malus communis*, which included all cultivated crabs and apples, but excluded the *Malus* of eastern Asia and North America, which are very different species.—It appears necessary to divide *Malus communis* into 4 elementary species, capable of hybridizing among themselves and producing many fertile races which are sources of cultivated varieties. These species are *Malus acerba* Merat, *M. dasyphylla* Borkh., *M. praecox* Borkh. (these 2 are often united as *M. pumila* Mill.), and *M. prunifolia*.—The species *M. acerba* Merat (1815) includes apples growing spontaneously in the forests of nearly all of Europe. It had previously been designated under the name *M. spinosa* Roussel, Fl. Calvados (1806) and as *M. sylvestris*, Miller Gard. Dict. (1759). It is this last and oldest name that should be preserved.—All French authors have erroneously assigned the origin of cider apples to *M. acerba* and of table apples to *M. dasyphylla*. Examination of many varieties of cider apples, cultivated in the west, proves that none of them agreed with *M. acerba*, but they should be referred, like the varieties of our gardens, to *M. dasyphylla*, a species introduced from Spain. The explorer G. CAPUS discovered *M. dasyphylla*, occurring spontaneous in forests in Armenia and Turkestan, in 1881. Its culture extended from remote antiquity throughout the borders of the Mediterranean Basin and to-day it is found subspontaneous in forests of Sicily and of Spain. The author observed it under similar conditions in the department of Alpes-Maritimes approaching an altitude of 3000 feet.—This species, represented in its native home by many races (*M. mitis*, *M. astracanica*, *M. Neidzwetzkayana*, etc.) has been the point of departure of edible varieties cultivated in Egypt under the 19th dynasty (JORET).—*M. praecox* is only another paradise or Saint-Jean apple used as a stock for dwarfing garden varieties. It came originally from the southeast in Russia and Asia Minor and appears to have been carried to Europe at the time of the Crusades. *M. prunifolia* originated in central Asia and its culture has spread on the one hand towards Russia and Siberia and on the other towards China and Japan.—The 4 species cited and their diverse races, still not well known, transformed by culture and by hybridizing among themselves in various degrees, have supplied the very numerous kinds of cultivated apples. [See also Bot. Absts. 8, Entry 377; 9, Entry 1288.]—*C. S. Crandall.*

1312. Child, C. M. **Studies on the dynamics of morphogenesis and inheritance in experimental reproduction. XI. Physiological factors in the development of the Planarian head.** Jour. Exp. Zool. **33**: 409–433. *33 fig.* 1921.—Form of head, sense organs, and ganglia in regenerating Planaria depend on position of cut, physiological gradients, and other things, as well as heredity. What is inherited is a group of potentialities, certain ones of which are realized. Environment affects development through differential inhibitions. Normal development is uniform because conditions are uniform. Alterations initiated quantitatively produce qualitatively different results in morphology and physiology.—*A. Franklin Shull.*

1313. Classen, K. **Vererbung von Krankheiten und Krankheitsanlagen durch mehrere Generationen. [Heredity of diseases and of disease tendencies during several generations.]** Arch. Rassen.- u. Gesellschaftsbiol. 13: 31–36. 1918.—A case of hereditary nervous weakness is reported which expresses itself through various grades of weaknesses and scoliosis of the vertebral column up to hereditary cerebellar ataxy. Anatomical symptoms consist in marked weakness and tremor of the limbs and facial muscles, and atrophy of the cerebellum. It does not begin before 50 years of age. The author gives considerable pedigree of the family showing the occurrence of various degrees of the disturbance. He suggests that modern experimental methods will explain the pedigree but does not venture a more detailed statement.—*C. C. Little.*

1314. Correns, C. **Individuen und Individualstoffe. [Individuals and individual substances.]** Ber. Senckenberg. Naturf. Ges. Frankfurt a. M. 47: 65–66. 1919.—Inhibitive substances responsible for self-sterility, failure of tissue transplantation, and substances responsible for individual odors are not necessarily due to the existence of individual substances. The conception of individual substances, in the sense of chemical materials peculiar to an individual and not connected with heredity, is inconsistent with modern studies of genetics. Individuality is the expression of a particular combination of heritable units acting in a particular environment.—*R. E. Clausen.*

1315. Crandall, C. S. **An experience in self-fertilization of the peach.** Proc. Amer. Soc. Hort. Sci. 17: 33–37. 1920 [1921].—Peach blossoms under control were subjected to 2 treatments: (1) Blossoms without apparent imperfections were pollinated, after emasculation, with pollen from the same tree; (2) blossoms were covered, without previous emasculation or hand-pollination. The trees used were seedlings from various crosses. Of 1207 hand-pollinated blossoms 36.2 per cent set fruits, of which 4.5 per cent had undeveloped embryos, and from which 43.25 per cent furnished trees for the orchard (1 tree to 6.38 flowers). Of 1230 covered buds not hand-pollinated 15.68 per cent set fruit, of which 31.41 per cent furnished trees for the orchard (1 tree to 20.5 buds). Individual variations are given, ranging from 11.68 to 61.42 per cent of blossoms setting fruits from hand-pollinations. Germinations ranged from 0 to 95.45 per cent. In the greenhouse 30 per cent of hand-pollinated blossoms yielded fruit, of which about 32 per cent had undeveloped embryos. From 1955 blossoms pollinated in 1915–1919 inclusive, 647 fruits were obtained (33.7 per cent). of which 441 (68.2 per cent) had developed embryos and from which 28 trees were obtained, furnishing 1 tree to 70 flowers. [See also Bot. Absts. 9, Entry 807.]—*C. H. Connors.*

1316. Crow, J. W. **Breeding method with horticultural plants.** Proc. Amer. Soc. Hort. Sci. 16: 19–24. 1919 [1920].—The author classifies plants for breeding according to method of propagation into the 3 major divisions with various subdivisions; examples are given of each. The principles of evolution as well as of plant breeding concerned in the work are noted; likewise the importance of mutations and subsequent pedigree tests. Lettuce has been found to be completely self-fertilized and celery nearly so. The author's work with onions shows that more progress can be made by selfing. Choice stalks are grown under glass and these are later hand-pollinated. It is noted that much of the disappointment experienced by breeders in the past has been due to the use of material carrying undesirable characters. Selfing is suggested as a means of purifying strains, subsequently crossing the purified strains to get desired combinations.—Many of the most important breeding problems depend on com-

bining vigor, or constitution, with other desirable characters, such as texture, size, color, and aroma. "It seems to be the fact that, in general, plants inherit type and constitution more largely from the mother than from the pollen parent." This conclusion is based on extensive work with strawberries. In practice the aim "is to get the individual which combines in fullest measure the constitution of one parent and the finer qualities of the other." In general these 2 qualities are not usually found united in the same individual. The author has evidence which suggests the desirability of using the higher quality plant as the ovule parent and the robust one as pollen parent since it is probable that "by this method it is possible to eliminate a very much larger percentage of seedlings in the first two or three years." On the other hand, if a robust plant is used as mother, a larger percentage of seedlings of robust constitution is obtained, which require years of time in testing. This method is suggested in hybridizing roses and fruits where hardiness is a desirable factor.—Regarding the inheritance of disease resistance, the generally accepted belief is noted that the difference in virulence of different strains of organisms may be equal to or greater than the difference in resistance of the cultivated plants; but the possibility is suggested of incorporating disease resistance of some varieties, in which it is general, into other varieties in which it is absent. The author also suggests the substitution of the word "isolation" for the commonly used term "selection," because the former term more nearly describes what is really practiced in improvement work. [See also Bot. Absts. 6, Entry 115.]—*C. E. Myers.*

1317. CURTIS, ROBERT S. **The fundamentals of livestock judging and selection.** *14 × 20.5 cm., 464 p., 190 fig.* Lea & Febiger: Philadelphia, 1920.—A text-book of livestock judging; first edition appeared in 1915.—*Sewall Wright.*

1318. CUTTING, E. M. **Heterothallism and similar phenomena.** New Phytol. 20: 10–16. 1921.—The author reviews a number of papers pertinent to the subject of heterothallism, notably those of BLAKESLEE, BURGEFF, ATKINSON, GRUBER, and BURGER, on various Mucorine fungi. Similar phenomena observed by CLINTON and by MURPHY in *Phytophthora* spp., by FITZPATRICK in *Eocronartium*, by KNIEP and BENSUADE in various Basidiomycetes; by EDGERTON in *Glomerella*; and by TAUBENHAUS in *Sclerotium Rolfsii* are mentioned and discussed.—*Charles Drechsler.*

1319. CZUBER, E. **Über Funktionen von Variablen, zwischen welchen Korrelationen bestehen.** [**Functions of variables between which correlations exist.**] Metron 1: 53–61. 1920. —The author extends PEARSON'S formulae for the mean and standard deviation of an index to the general case, expressing the mean and standard deviation of any function in terms of the means, standard deviations and coefficients of correlation of its arguments.

$$\text{If } V = f\,(X_1, X_2, \ldots X^n)$$

$$M = \frac{1}{N}\Sigma\,(V) = f + \tfrac{1}{2}\left[f_{11}\sigma_1^2 + f_{22}\sigma_2^2 + \ldots + f_{nn}\sigma_n^2\right]$$
$$+ f_{12}\sigma_1\sigma_2 r_{12} + f_{13}\sigma_1\sigma_3 r_{13} + \ldots + f_{23}\sigma_2\sigma_3 r_{23} + \ldots$$

where $f = f\,(M_1, M_2, \ldots M_n)$, M_1 being the mean of X_1, etc.

$$f_1 = \frac{\partial f}{\partial M_1}, \quad f_2 = \frac{\partial f}{\partial M_2}, \ldots$$

$$f_{11} = \frac{\partial^2 f}{\partial M_1^2}, \; f_{12} = \frac{\partial^2 f}{\partial M_1 \partial M_2}$$

$$\sigma_v^2 = f_1^2\sigma_1^2 + f_2^2\sigma_2^2 + \ldots + f_n^2\sigma_n^2 + 2f_1f_2\sigma_1\sigma_2 r_{12} + 2f_1f_3\sigma_1\sigma_3 r_{13} + \ldots$$
$$+ 2f_2f_3\sigma_2\sigma_3 r_{23}.$$—*John Rice Miner.*

1320. DEHORNE, LUCIENNE. **Hermaphroditisme et scissiparité.** [**Hermaphroditism and schizogenesis.**] Compt. Rend. Acad. Sci. Paris 169: 1110–1112. 1919.—It has long been known

that all buds in 1 chain of Polychaete *Myrianida* are of the same sex, and that male-producing and female-producing stocks are alike in structure and behavior. These stocks, however, are different in certain biological features. Thus, male-producing stock buds more freely, since 10–30 individuals are found in one male chain, rarely more than 5 in one female chain. Also, male-producing stock is slender, its tissues transparent, its nephridia indistinct like those of a young worm, while female-producing stock is stouter, and its tissues dense and opaque like those of the old animal. At the beginning of sexual reproduction (March) male chains are rare and female chains rather common, and there are many fragile specimens not yet budding. Non-budding individuals decrease and male chains increase in number as the season advances, until male chains are the more abundant. As autumn approaches, however, female chains are in the majority. Male chains collected in this latter period have fewer individuals and male-producing stocks are stouter than earlier in the season. As a male-producing *Myrianida* ages it approaches the condition of female-producing stock, acquiring a degree of intersexuality; that is, in a sense, it is a protandrous hermaphrodite. Changes are related to activity of metabolism, a high rate being associated with male-production, a lower rate with female-production.—*A. Franklin Shull.*

1321. Dembowski, Jan. **Das Kontinuitätsprinzip und seine Bedeutung in der Biologie. [The principle of continuity and its significance in biology.]** Vortr. u. Aufsätze Entwicklungsmech. Org. **21:** 1–132. 1919.—In evolution, characters do not arise singly and successively; the whole organism is altered simultaneously. Neither evolution nor ontogeny can occur under constant conditions. Definitions of heredity involving parent and offspring are misleading, since heredity is a process and is continuous. Germ-plasm is the basis of continuity, but Weismann's theory employing a system of discrete objects violates the principle of continuity. The whole organism is composed of germ-plasm. Germ cells hold no independent place in the organism; there is no fundamental distinction between soma and germ-plasm, and no distinction between inherent and acquired characters. The capacities of living substance have no beginning, they simply exist. The development of any animal rests upon one phenomenon, namely, continuity of living substance with all its capacities and properties. The gene is not a unit of heredity, but a unit of development; the organism does not consist of such units, Mendelians merely recognize them. Progress in heredity will be made only when causes of phenomena are discovered, and such discoveries will come, not from hybridization experiments, but from study of general physico-chemical processes in ontogenetic development. Form in embryogeny is the result of the physico-chemical constitution; it is never a cause, being itself the effect of properties of living substance. Individuality of chromosomes is not proved by constancy of number, nor by constant size differences, nor by constant differences of form; and other evidences of individuality are of doubtful or negative value. Reduction division is asserted to result in all possible combinations of chromosomes, hence chromosomes must be equal, otherwise abnormalities would occur. The structures in the nucleus have no greater influence on development than do yolk and oil droplets. Facts supposed to show the importance of chromosomes may be otherwise explained. Chromosome theories of heredity have no significance. To find the material of heredity the chemistry of protoplasm must be studied. A developing embryo is a single continuous thing, its division into cells is of no significance. A formless, little-differentiated living substance, or plasma, is responsible for the course of development. The fate of blastomeres depends on their chemical and physical composition and that of their surroundings. Gastrulation is a physical phenomenon. The course of regeneration depends upon undifferentiated plasma, and the problem of regeneration is much like the problem of ontogeny, for germ-cells are not predestined elements but owe their capacities to their origin from plasma not involved in ontogeny. Regeneration is not a function of cells at the wound, but of the entire continuous organism, for cells at the wound would not, apart from the remainder of the whole, regenerate what they do. The principle of continuity harmonizes the contradictions of vitalism. It shows, for example, that an echinoderm egg is neither a machine nor a harmonious equipotential system. The statement of the vitalist that biology is an independent fundamental science violates the principle of continuity because it confuses phenomena with the method of investigation.—*A. Franklin Shull.*

1322. Dunlop, W. R. **Variation in the banana.** Agric. News [Barbados] 20: 87. 1921.—The author notes a few earlier instances of variation in the banana. In 1895 a plant in Trinidad produced fruit low down on the side of the sucker (pseudostem). A Chinese banana, also in Trinidad, produced a double bunch of fruit, while there is an instance of a plantain from Bombay with 4 tassels of flowers. It is supposed that the 1st named peculiarity has a mechanical explanation while the 2 last-named phenomena are probably instances of the rare dichotomous branching of the Musas. From Barbados there is reported a bunch of bananas with twisted stem (fruit stalk), probably due to pathological disturbances. However, the most remarkable and interesting peculiarity observed is segregation of colors. The fruit of a variegated sucker observed by the author in Guatemala had the following composition and characteristics: Pure claret-colored (red) fingers, 20; pure green or yellow, 36; half-claret and half-green, 5; and red with green tip, 10. The claret fingers with green tips possessed the pronounced anterior rib with marked constriction at the tip common to the claret, but resembled the Gros Michel in size and, to a great extent, in color. The half-claret and half-green fingers resembled the Gros Michel in morphological characters. It is to be noted that the coloring of these fingers was definitely bilaterally asymmetrical.—*J. S. Dash.*

1323. Dunn, Grace A. **A comparative study of the two races of Rhizopus nigricans.** Physiol. Res. 2: 301–339. *1 fig.* 1921.—The author has studied chiefly the nutritive requirements of an individual (+) race and of an individual (–) race of *Rhizopus nigricans*, comparing them in respect to their physiological reactions under the terms "male" and "female." Using dry weight of harvest as the criterion, the best nutrient tested was a solution containing the following ingredients in the molecular concentrations indicated: KH_2PO_4, 0. 28; NH_4NO_3, 0.0462; $MgSO_4$, 0.0497; F_2PO_4, trace; dextrose, 1.0. The 2 races tested gave about equal dry weight harvests in all the solutions employed where dextrose was the source of carbon.—The 2 races are shown to differ physiologically in 3 respects although "of course the male and female races of other strains of *Rhizopus nigricans* might not show these differences." (1) They behave complementarily in conjugating; (2) the "male" race produces a greater abundance of sporangia in good solutions than does the "female"; (3) the "male" race produces a greater dry weight harvest in solutions where glycerine is the source of carbon. This threefold generalization is offered as a step toward an analysis of the physiological differences connected with the sexual difference between the 2 races.—*A. F. Blakeslee.*

1324. Eriksson, Gösta. **Gedanken zur Rotkleezüchtung.** [Thoughts on red clover breeding.] Zeitschr. Pflanzenzücht. 8: 79–85. 1921.—The average red clover crop of Sweden, Norway, and Denmark is but 25–30 per cent of the maximum. This reduction is due in part to improper preparation of hard seed and to improper mixtures of clover with grasses used. The best farmers grow their own seed and sow it without preparation, often in an unhulled condition.—The writer observed that some place strains, in comparative trials, did comparatively much better in certain years, due mainly to differences of reaction toward soil moisture.—Certain colors, such as gray, characteristic of some strains, are apparently responsible for the easy invasion of certain parasitic organisms. Clover strains with certain colors of seeds, leaves, and stems are recommended.—Locally adapted place strains of red clover develop which often can not be grown successfully even in nearby localities. Red clover seed should not be exchanged or transferred geographically without critical knowledge of controlling factors and reactions to them.—*L. R. Waldron.*

1325. Firbas, Heinrich. **Über künstliche Keimung des Roggen- und Weizenpollens und seine Haltbarkeit.** [Artificial germination of rye and wheat pollen and their longevity.] Zeitschr. Pflanzenzücht. 8: 70–73. 1921.—The author reviews previous findings in regard to the longevity of wheat and rye pollen, and discusses briefly the conditions affecting germination in artificial media and on stigmatic surfaces. It is concluded that temperature, air humidity, and age affect the viability of pollen.—*F. P. Bussell.*

1326. Fischel, Alfred. **Ursachen tierischer Farbkleidung.** [Causes of animal coat color.] Arch. Entwicklungsmech. Org. 46: 202–209. 1920.—A criticism is presented of a

paper of the same title by H. Przibram (Arch. Entwicklungsmech. Org. **45**: 199–259. 1919). The latter, according to Fischel, attempts to interpret animal coat colors in too simple a way as the product of certain chemical and physical factors, due regard not being given to the morphological evidence on the part played by specialized pigment cells.—*Sewall Wright.*

1327. Franz, V. [German rev. of: (1) Gottschick, F. **Die Umbildung der Süsswasserschnecken des Tertiärbeckens von Steinheim a. A. unter dem Einfluss heisser Quellen. (The modification of fresh water snails of the Tertiary basin of Steinheim under the influence of hot springs.)** Jenaische Zeitschr. Naturwiss. 56: 155–216. *3 pl.* 1920. (2) Plate, L. **Bemerkungen über die deszendenztheoretische Bewertung der Umwandlungen von Planorbis multiformis. (Comments on the evolutionary significance of the polymorphism of Planorbis multiformis.)** Jenaische Zeitschr. Naturwiss. 56: 217–224. 1920.] Zeitschr. Indukt. Abstamm.- u. Vererb. 26: 182–184. 1921.

1328. Frateur, J. L. **La robe sauvage du lapin. [The wild coat of the rabbit.]** Réunion Soc. Belge Biol. **1919**: 941–943. 1919.—The author finds that crosses between rabbits with the agouti pattern of the wild species, and the black-and-tan variety give agoutis in F_1 and a 3:1 ratio in F_2. The black-and-tan variety is dominant over non-agouti and gives a 3:1 ratio in F_2. He concludes that the so-called agouti factor is complex. In either agoutis or black-and-tans, the white belly may or may not have a dark undercolor. Dark undercolor is dominant over pure white.—*Sewall Wright.*

1329. Fruwirth, C. **Zu obigem Originalartikel. [Relative to the foregoing article.]** Zeitschr. Pflanzenzücht. 8: 77–79. 1921.—[Comment on Raum. **Weissblühender Rotklee eine "umschlagende Sippe?" (White-flowering red clover an "ever-sporting variety?"** (See Bot. Absts. 9, Entry 1368).] The author presents data given him in a letter by Rimpau, and also data of his own, relative to inheritance of white in flower color in families of red clover. The data are inconclusive because a pure-breeding white-flowered strain of red clover was not certainly secured after several generations, although for a number of generations fertilization was done by bumblebees enclosed with isolated plants.—*L. R. Waldron.*

1330. Gabriel, Cyprien. **Sur un cas curieux d'adaptation florale. [A curious case of floral adaptation.]** Compt. Rend. Soc. Biol. 83: 1441–1442. 1920.—Attention is directed to a previously overlooked dimorphism of the flowers of *Anchusa officinalis.* Type A has clear blue corolla 1.3 mm. long by 1 mm. in diameter, relatively infertile anthers, and is visited by bees and flies. Type B has violet corolla, is 2 mm. deep by 1 mm. in diameter, has long well-developed stamens, and is visited by *Scolia hortotum.* Both types produce nectar but the *Scolia* can not reach it in type A. The latter type sets abundant seed while type B is probably entirely infertile, serving merely as the source of pollen for A.—*Leonas L. Burlingame.*

1331. Gallaud, M. **Une lignée de Giroflées à anomalies multiples et héréditaires. [A line of wall flowers with multiple hereditary anomalies.]** Compt. Rend. Acad. Sci. Paris 171: 47–49. 1920.—The author points out that unique examples of monstrosities in these plants have frequently been noted, but that there has been little precise knowledge of the relation of these forms to their parents or progeny.—He has studied 3 successive generations and furthermore has obtained as part of a single plant a large number of anomalies, some of which are already known and others are believed to be new. These are listed as follows: 1. *Pluricotyl embryos.* All seeds have shown this variation in percentages of from 7 to 100. The embryos have 1, 3, 4, or 5 distinct cotyledons, several of which have doubled lobes.—2. *Vegetative anomalies.* These include leaves with many points but with acuminate lateral expansions; also many which are undulated and strongly honeycombed. Some stalks manifest a tendency to fasciation with enlarged flattened branches and notable increase in density of leaves.—3. *Double flowers; proliferous shaded petals.* Next to the calyx is found a whorl of petals. The axis of the flower is elongated and bears a wreath of 10 or 11 petaloid pieces in 2 whorled series, following a novel lengthening of the axis and novel petaloid wreath. This phenomenon is repeated 6 times. All flowers of the stalks are double and sterile. The

percentage of double stalks ranges from 10 to 100.—4. *Double flowers by proliferation of the pistil.* In this type sepals, pistils, and stamens are formed normally but the pistil arises in a new flower, fitting in the first. The pistil of the 2nd type arises in turn in flower of third kind, etc. All flowers of the abnormal stalks are double.—5. *Plurivalved fruits.* Certain stalks have fruits usually pluricarpellate, giving 3, 4, or 5 petals with stigma having 3, 4, or 5 lobes. Some variations are present and not all fruits are aberrant; some fertile seeds are formed in both normal and pluricarpellate fruits.—6. *Intercarpellary flowers.* The anomaly is manifested in the first flowers by the presence of 3–4 carpels in the pistil, supplied with 3 to 4 stigmatic lobes. Seeds formed from these are capable of germination. The oldest flowers at the middle of the inflorescence have pistils alike but ovary forms a veritable intercarpellary flower. It is attached rather high on the placenta, which bears above and beneath it the atrophied but easily recognizable ovules. The intercarpellary flower thus gives proof of abnormal development in the ovule. The very small flower is complete with well formed sepals, petals, and stamens. The arrangement of parts, except as to number of members, is normal. Stamens are frequently devoid of pollen. The small pistil has always more than 2 carpels. One of the ovules instead of being rounded shows 3–4 lateral nipples. The anomaly persists even to the last flowers of the inflorescence.—These multiple anomalies and others not here noted are manifest in various directions in the organs, appearing more or less developed in each generation and show that there is a genuine and very intensive defect in this line of wall flowers. The author proposes to seek the cause of these hereditary variations and to determine the extent to which they can be fixed.—*C. E. Myers.*

1332. Gardner, V. R. **Bud selection, with special reference to the apple and strawberry.** Missouri Agric. Exp. Sta. Res. Bull. 39. *30 p.* 1920.—Apple trees grown as bud selections from high-yielding parents averaged about the same in yield as those from low-yielding parents. Selections from strawberries of high and low yield did not produce in general new strains of high- or low-yielding ability. The author notes a "running out" or "degeneration" in some bud selections. This is of 3 types: (a) Loss of ability to produce fruit; (b) loss of ability to produce runners; (c) reduction in general vegetative vigor. It is suggested that bud selection may be used as a means of keeping plants up to standard. There is also noted a case (which the author considers as reversed dominance) in which parental characters are changed in the offspring.—*F. R. Clark.*

1333. Gebhardt, Curt. **Die Grossknolligkeit der Kartoffelzüchtungen. [Largeness of tubers in potato breeding.]** Zeitschr. Pflanzenzücht. 8: 85–88. 1921.—In a study of potato varieties, the writer found the number of large and small tubers produced by healthy and uninjured plants to be a varietal characteristic. Data are given in tabular form on the performance of 8 varieties.—*Richard Wellington.*

1334. Goldschmidt, Richard. **Kleine Beobachtungen und Ideen zur Zellenlehre. III. Die Bedeutung der atypischen Spermatozoen. [Minor observations and ideas on cytology. III. The significance of atypic spermatozoa.]** Arch. Zellforsch. 15: 291–300. 1920.—Previous observations had not shown that atypic spermatozoa function in fertilization, nor that they related to sex determinations, nor that they have any other function. The author describes experiments indicating that atypic spermatozoa are functionless, as follows: Male gipsy moths with low degree of intersexuality produce chiefly normal spermatozoa, while those with a high degree of intersexuality produce mostly atpyic spermatozoa. Females mated with these intersexual males laid eggs; when high-grade intersexual male was used no larvae resulted (indicating that eggs were not fertilized), when medium intersexual male was used a few larvae developed, and when low-grade intersex was used larvae developed in normal numbers.—The production of atypic spermatozoa accompanies degenerative changes of other kinds, occurs to a high degree in transplanted testes, and is referred by the author to physicochemical causes.—*A. Franklin Shull.*

1335. Hammarlund, C. **Über die Vererbung anormaler Ähren bei Plantago major. [Inheritance of abnormal spikes in Plantago major.]** Hereditas 2: 113–142. *7 fig.* 1921.—Four

forms of plantain are concerned: (1) The normal form with long simple spikes and small bracts; (2) a form with branched spikes; (3) a form with bracts replaced by leaves, the spike being thus pyramidal; and (4) a form with bracts replaced by leaves and spike shortened to a rosette. All these were self-fertile.—Branched by normal gave normals in F_1. In F_2 the ratios varied in different families, but selfed branched plants gave progenies with varying percentages of apparent normals. In the 2nd year, however, these same F_2 plants showed approximately 3 normals to 1 branched. This ratio was confirmed by a full F_3.—Pyramidal by normal gave normals in F_1. In F_2 the proportion was 12 normals to 3 rosetted to 1 pyramidal. Many seedling rosette plants perish prematurely unless special precautions are taken; and pyramidals are slightly less viable than normals. This proportion was confirmed by a full F_3.—*John Belling.*

1336. HANCE, ROBERT T. [Rev. of: KUWADA, Y. **Die Chromosomenzah' von Zea Mays L. Ein Beitrag zur Hypothese der Individualität der Chromosomen und zur Frage über die Herkunft von Zea Mays L. (The chromosome number of Zea Mays L. A contribution to the hypothesis of the individuality of chromosomes and to the problem of the origin of Zea Mays L.)** Jour. Coll. Sci. Imp. Univ. Tôkyô 39: 1–148. *2 pl., 4 fig.* 1919 (see Bot. Absts. 4, Entry 643).] Amer. Nat. 55: 268–275. 1921.

1337. HANSEN, W. **Die Ermittlung des Einzelkorngewichtes einer Pflanze. [Determination of the weight of individual grains of a plant.]** Zeitschr. Pflanzenzücht. 7: 225–227. 1920.—Determinations of the average weight of wheat grains based upon 2 samples of 50 each closely parallel the average weights of 1000 kernels and are considered a better measure for the purpose of selection than the average weight based upon all the seeds which the plant produces. Factors which increase the number of grains per plant tend to make the weights of individual seeds less. The taking of sub-samples by selecting the larger kernels is considered to give a truer indication of the size of seed. The same method applies with oats and only the upper seed in each spikelet need be considered.—*D. F. Jones.*

1338. HANSEN, W. **Die Mahndorfer Pflanzenzüchtung bzw. das Mahndorfer Usancenbuch. [The Mahndorf plant breeding or the book of Mahndorf methods.]** Zeitschr. Pflanzenzücht. 7: 283–318. *5 fig.* 1920.—The author describes the development and application of the plant breeding methods in use at Mahndorf, dedicated to Mr. HACKE at the celebration of his 25 years of service as administrator. Following the results of BESELER and RIMPAU in Germany and the Svalöf Station in Sweden, the individual-plant-selection method was started in 1902 with peas and wheat. Attention has been chiefly confined to single varieties of the principal crops,—rye, winter wheat, summer wheat, barley, oats, and peas,—and in addition some work has been done with alfalfa, turnips, maize, poppy, rape, carrots, and grass. The principal qualities of the improved strains of these plants are stated, together with detailed descriptions of the methods of planting, arranging the plants in the field, harvesting, and recording results.—*D. F. Jones.*

1339. HARRIS, J. ARTHUR, AND F. G. BENEDICT. **The variation and the statistical constants of basal metabolism in men.** Jour. Biol. Chem. 46: 257–279. *1 fig.* 1921.—This paper presents: (1) A measure of the variability of the basal metabolism of the normal individual; (2) a consideration of the relation between the length of time over which the observations extend and the variation in the metabolism of the individual; and (3) a consideration of the most suitable method for determining the population mean from measurements on a series of individuals. The results show significant ranges and standard deviations of metabolism (C. V. about 4 per cent). The variability in metabolism of the individual is positively correlated with duration of the period of time over which the observations have been distributed. The population constant derived from individual means is less modified by weighing than that deduced from individual minima. Weighing by method of means and on the basis of the square root of the number of days covered by observations is suggested.—*John W. Gowen.*

1340. Harrison, J. W. Heslop. **The inheritance of size in the crosses involving Oporabia autumnata and O. filigrammaria.** Vasculum 7: 49–56. 1921.—Mean wing length of the ♂ in the geometrid subspecies *O. autumnata* is 18 mm., in *O. filigrammaria* 16 mm. (81 and 91 individuals respectively). Arranged in groups based on 0.5 mm. differences, the larger species has its mode in "Class 10"; the smaller in "Class 6." Both F_1 and F_2 hybrids are intermediate, with modes in "Class 7" (means, 16 mm. and 16.85 mm.). F_1 parents of mean size gave F_2 showing no increased, but rather lessened, variability, that is, with 4.9 as the coefficient of variation as compared with 5.1. F_3 from unselected and mixed F_2 parents tends to resemblg F_2 in size with slightly increased variability (especially true of ♀♀), both in certain individuals showing intermediate coloration and in others constituting a peculiar group of segregates as to color. Back-crosses similarly lend no support to the multiple-factor hypothesis, fluctuating about means intermediate between those of the 2 pure types (that is, 16.5 mm.—17.5 mm. in back-crosses, as compared with 16 mm.—18.1 mm. in pure types) and within narrow ranges. A comparative study of the ♂♂ of the various families under consideration corroborated the conclusions drawn from the examination of the ♂♂.—The results are "opposed to the multiple-factor theory of size determination unless it be granted that such factors do not segregate pure in gametogenesis but rather enter the F_1 gametes in an average or contaminated condition."—*J. H. Gerould.*

1341. Hartwell, Burt L. **Thirty-first annual report of the Director of the Rhode Island Agricultural Experiment Station.** Bull. Rhode Island State Coll. 14: 57–65. 1919.—"The inheritable character to lay large eggs is not joined with high annual production; but a high percentage increase in egg-weight, usually during April and September, does appear to be associated with high annual production in numbers, at least for the first year."—Reciprocal crosses between heavy Cornish fowl and light-weight Hamburgs are reported as having been made in 1918 but results are not given.—*William A. Lippincott.*

1342. Kelley, F. J. **Substitutes for the words homozygous and heterozygous.** Science 50: 458–460. 1919.—The common non-technical substitutes, pure, pure-bred, impure, mixed, hybrid, mongrel, cross-bred, are descriptive of origin. Mendel himself used "constant" in the sense of homozygous. This term is not subject to the above objection, and inconstant may suitably be used for heterozygous.—*John Belling.*

1343. Knibbs, G. H. **The theory of large population-aggregates.** Metron 1: 113–125. 1920.—The tendency of population to increase in geometrical progression may be modified by other factors coming into operation. The rate of increase is affected by the natural resources of the country, by technical skill, and by the standard of living. The possible density of population is limited. The curve $T = k\,t^{\,m-nt}$ is suggested to describe the increase and ultimate decrease of population. Pressure of population produces war.—*John Rice Miner.*

1344. Knight, L. I. **Physiological aspects of self-sterility of the apple.** Proc. Amer. Soc. Hort. Sci. 14: 101–105. 1917 [1918].—In self-pollinated Rome Beauty apples the pollen germinates properly, so that self-sterility is not due to pollen sterility. Asparagin present on the style does not retard growth; it has an accelerating effect in artificial cultures of pollen. The maximum growth of Rome Beauty pollen tubes in artificial cultures exceeded the length required to reach from the stigma to the egg when Rome Beauty flowers are self-pollinated. The maximum length of 10 mm. was attained by about 5 per cent of the tubes in 2 days, the required length for Rome Beauty styles being 7 mm. Pollen is not sensitive to excess moisture since Rome Beauty pollen germinates well in distilled water. No mechanical obstruction to the growth of pollen tubes was found. When Rome Beauty was pollinated with Jonathan, the pollen tubes traversed the length of the style in 48 hours whereas tubes from Beauty pollen were still growing in the style at the end of 120 hours when kept at a moderate temperature; at higher temperatures, 80–90° F., 24 hours only were required to traverse the style in selfed Rome Beauty. At the end of 120 hours the egg cell begins to disintegrate, inhibiting fertilization. The relatively slow rate of growth of Rome Beauty pollen tubes in Rome Beauty stylar tissue is suggested as an important factor in the self-sterility of that

variety, egg disintegration beginning before fertilization can take place. More rapid tube growth at higher temperature may explain self-fertility under certain climatic conditions in varieties which are usually self-sterile.—*J. P. Shelton.*

1345. LATHOUWERS, V. **Variations speltoides dans des lignées pures de Froment et dans une population d'Epeautre.** [Speltoid variations in pure lines of wheat and in a population of einkorn.] Bull. Soc. Roy. Bot. Belgique 54: 218–223. 1921.—In 1919 in 2 pure lines belonging to different varieties of wheat, under observation since 1913, 2 aberrant plants were found, having the same aspect as those described by NILSSON-EHLE of Svalöf under the name "speltoid mutations." The author studied the 2nd generation of these, besides an aberrant plant in a "population" of einkorn. His observations did not permit him to draw any definitive conclusion. He hopes that the 3rd generation will demonstrate whether mutation or spontaneous hybridization has occurred.—*Henri Micheels.*

1346. LILLIE, FRANK R. **Studies of fertilization. IX. On the question of superposition of fertilization on parthenogenesis in Strongylocentrotus purpuratus.** Biol. Bull. 40: 23–31. 1921.—In a series of carefully controlled experiments, the author shows that eggs of *Strongylocentrotus purpuratus*, which have formed membranes as a result of treatment with butyric acid, are usually incapable of fertilization with sperm even though the membranes are destroyed by shaking immediately after they have been formed; exceptions (1–5 per cent) are explained by the assumption that the reaction after treatment with butyric acid is incomplete. The membrane reaction following butyric acid is the same as that following insemination; this is shown by similarity of the membranes formed in the 2 cases, and by the fact that the rate of formation is the same.—*Bertram G. Smith.*

1347. LINDSTROM, E. W. **Concerning the inheritance of green and yellow pigments in maize seedlings.** Genetics 6: 91–110. 1921.—The author analyzes the inheritance of 3 colors in the seedling leaves of maize. These colors are known as white, virescent, and yellow, and the factor pairs are designated *Ww*, *Vv*, and *Ll*. These 3 leaf-color factors are found to be independent in inheritance and in addition the *Ll* factor pair for yellow leaves is found to be closely linked with the *Rr* factor pair for the aleurone color of the seeds. There is but 1.6 per cent of crossing over between the *Ll* and *Rr* factors.—*J. H. Kempton.*

1348. LOTSY, J. P. **Oenothera-proeven in 1919.** [Oenothera experiments in 1919.] Genetica 2: 385–399. *1 pl., 3 fig.* 1920.

1349. LOVE, JAMES KERR. **The origin of sporadic congenital deafness.** Jour. Laryngol. Rhinol. and Otol. 35: 263–270. 1920.—The paper undertakes to show that "sporadic congenital deafness is hereditary and that such heredity is Mendelian." The subject is discussed theoretically, and cases are cited to show that the deafness behaves as a Mendelian recessive. A chart of "The Ayrshire Family" gives a concrete illustration and shows 5 affected generations descended from a common ancestor 3 generations further back. The family is Scotch but has branches in America and Australia.—*Howard J. Banker.*

1350. MACDONALD, ARTHUR. **Scots and Scottish influence in Congress.** Metron 1: 140–155. 1920.—A brief description is presented of the racial constitution of the Scotch and their characteristics emphasizing especially their "independence, persistence, and zeal for education," fearlessness, and family feeling. These qualities are illustrated by the performances of Scotch immigrants to the U. S. A. and the many Scotch political leaders in American history. Then follows a statistical analysis of the Senate of the 62nd Congress of the U. S. A. and its legislative work showing the leadership of the Scotch constituency. The paper closes with a comment on the decreasing number of great statesmen, attributing this to the increase in complexity of the environment through social inheritance "while our inherited natures remain unchanged;" "social heredity has outrun germinal heredity."—*Howard J. Banker.*

1351. MARCHAL, E. **Recherches sur les variations numériques des chromosomes dans la série végétale.** [Studies on the numerical variations of the chromosomes in plants.] Mem.

Acad. Roy. Belgique Cl. Sci. Ser. II. 4: 1–108. *4 pl., 24 fig.* 1920.—This work, describing the results of the author's cytological studies on *Campanula* and the Compositae Liguliflores, is largely a critical review of the chromosome number reported for the various groups of the plant kingdom. He concludes that there is no absolute relation between chromosome number and plant complexity (taxonomic position), but that there appears to be a suggestive relation between the chromosome number of plants nearly related, that is, plants within a taxonomic group may possess chromosome numbers that may be arranged in geometrical or arithmetical progression, indicating, possibly, a common ancestry which has given rise to the new forms through chromosomal mutations of one kind or another. The usual methods by which the chromosome number may be permanently modified are discussed. The volume and the dimensions of chromosomes are very briefly considered. That markedly different plant forms may possess chromosome complexes alike as far as number is concerned is intelligible to the author in the light of the different physiological effects produced by bacteria morphologically similar.—*Robert T. Hance.*

1352. Minoura, Tadachika. **A study of testis and ovary grafts on the hen's egg and their effects on the embryo.** Jour. Exp. Zool. 33: 1–61. *10 pl.* 1921.—Following the grafting of pieces of ovary (or testes) upon the embryonic membranes of developing chickens, deviations from the normal in the reproductive systems of the hosts were observed in some instances, pointing toward the production of hormones by the engrafted gonad capable of modifying the development of the primary sex organs along the lines suggested by Lillie in accounting for the free-martins.—*H. D. Goodale.*

1353. Miyazawa, B. **Studies of inheritance in the Japanese Convolvulus. Part II.** Jour. Genetics 11: 1–15. *1 colored pl.* 1921.—The previous article states that yellow-leaved plants never bear dark red flowers, but recently the author has obtained a yellow-leaved race with dark red flowers. Various crosses are described with data, and the streaking on solid colored flowers and the correlations of leaf and flower colors are noted. The observations are interpreted on a factorial basis. G = gene for green color in leaf; D = dark red flower color when the accompanying G is homozygous; B = blue color; M = modifier of tone of flower color both in homozygous and heterozygous condition. Summary: (1) Light magenta color in F_1 is produced when both G and D are in heterozygous condition and bluing gene B and modifying gene M are brought in from parent A. (2) Reciprocal hybrids are similar to each other in all respects. (3) D produces dark red colors when G is present in homozygous condition but dark red (magenta and scarlet) when G is heterozygous or absent. Such an interrelation between G and D is found only in hybrids between plants A and B and does not exist in other hybrids though C has colors closely related to those of B. (4) The fact that D has such a character is seen from results in which all 3 families of offspring of a hybrid which is green, white and yellow, and deep scarlet, respectively, produced dark red colors. (5) The effects of B are not manifested in individuals which are in the homozygous condition with respect to G. (6) Magenta color appears in plants which have the constitution DB, either Gg or gg being present at the same time. On the contrary, scarlet appears only in plants which are in condition Db. (7) White appears in individuals when D is absent and then G, B, and M may be in any condition. (8) Interrelations between D and M are as follows: DdM = light color; DD = medium color; $DDmm$ and $Ddmm$ = deep color. (9) Magenta color is dominant over scarlet and dark red, and scarlet dominant over dark red. (10) There may exist homozygous plants with respect to flower color with medium and deep tones of magenta, scarlet, and dark red, but the authors have found no individuals with light tones of these colors.—*E. E. Barker.*

1354. Mohr, Otto L. **A case of hereditary brachyphalangy utilized as evidence in forensic medicine.** Hereditas 2: 290–298. *10 fig.* 1921.—The publication deals with a paternity case in which the author had to give an opinion as medical expert. The man upon whom an illegitimate child had been fathered denied the parentage. It was found that he suffered from a pronounced case of a dominant hereditary brachyphalangy affecting the 2nd row of phalanges on the II–IV fingers and toes; thumbs were normal but the basal phalanx of big toes was shortened. The child's hands and feet exhibited an exactly similar malformation. Com-

parison of the radiographs revealed an absolute correspondence, even in details between the man's and the child's type of brachyphalangy. The possibility of the mother being acquainted with other brachyphalangious men could be excluded, and the conclusion given in the case was positive. The man, according to the judgment passed, was found to be the father of the child mentioned.—*Otto L. Mohr.*

1355. MOHR, OTTO L. **En arvelig misdannelse som bevismiddel i en farsskapssak.** [A hereditary malformation as evidence in a paternity case.] Tidsskr. Norske Laegefor. **40:** 521–529. *6 fig.* 1920.—A short account is presented of the case mentioned in the preceding abstract.—*Otto L. Mohr.*

1356. MOORE, CARL R. **On the physiological properties of the gonads as controllers of somatic and psychical characteristics. III. Artificial hermaphroditism in rats.** Jour. Exp. Zool. **33:** 129–171. *15 fig.* 1921.—Grafts of an ovary (or testis) into a hemicastrated animal of the opposite sex were successfully made (persisting at least 8½ months) without evidence of deleterious influence on the host's somatic or psychical characteristics, nor was there evidence of an antagonism between the 2 unlike gonads.—*H. D. Goodale.*

1357. MORISHIMA, KAN-ICHIRO. **Variations in typhoid bacilli.** Jour. Bacteriol. **6:** 275–323. 1921.—Alterations induced in the fermentation of arabinose, dulcitol, glycerol, inosite, raffinose, rhamnose, salicin, and xylose, as well as alterations occurring in artificial environment in reference to the production of acid and alkali, in agglutination, and the formation of "daughter colonies," should be regarded as variants and not as deVriesian "mutations."—*Andrew I. Dawson.*

1358. NACHTSHEIM, HANS. **Die Bestimmung des Geschlechtes bei Dinophilus.** [The determination of sex in Dinophilus.] Sitzungsber. Ges. Morphol. Physiol. München **1919:** 46–53. 1920.

1359. NACHTSHEIM. [German rev. of: MORGAN, THOMAS HUNT. **The physical basis of heredity.** *14 × 21 cm., 300 p., 117 fig.* J. B. Lippincott Co.: Philadelphia, 1919 (see Bot. Absts. 5, Entry 422; 7, Entry 938).] Zeitschr. Indukt. Abstamm.- u. Vererb. **26:** 176–178. 1921.

1360. NILSSON-EHLE. [German rev. of: FRUWIRTH, C., TH. ROEMER, UND E. VON TSCHERMAK. **Handbuch der landwirtschaftlichen Pflanzenzüchtung. 4. Die Züchtung der vier Hauptgetreidearten und der Zuckerrübe. (Handbook of agricultural plant breeding. 4. Breeding of the four chief cereals and the sugar beet.)** *3rd ed., 8 vo., xv + 504 p., 42 fig.* Paul Parey: Berlin, 1918 (see Bot. Absts. 6, Entry 1081).] Zeitschr. Indukt. Abstamm.- u. Vererb. **26:** 175–176. 1921.

1361. [PALMER, E. F.] **Report of the Ontario Horticultural Experiment Station, Vineland Station, Ontario.** **1918:** 1–40. 1919.—The "Plant Breeding Report" occurs on pages 9–21, and is devoted mainly to the progress of fruit and vegetable breeding projects. A few Early Crawford peach seedlings which had fruited were apparently worthless, while a Leamington self-fertilized seedling showed much promise. Seedlings of *Rubus occidentalis* and Gregg (black raspberry) came so true to type that it is deemed feasible to propagate black-caps by seed. Slight variations were noted in the degree of thorniness, habit of fruiting, and size and quality of the fruit in 410 seedlings of *Rubus strigosis* (wild red raspberry). All seedlings, 140 in number, of *Rubus occidentalis* (wild black) × *Rubus strigosis* (wild red) possessed characters of both species and bore purple fruits; while 230 plants of the reciprocal cross possessed wild red raspberry foliage and thornier canes than the red raspberry and bore red fruits that were drier and firmer than the wild red. Seedlings, 152 in number, of Gregg × Cuthbert (red raspberry) gave 117 intermediate purple-fruited types, 28 black caps, and 7 red raspberries, or an approximate ratio of 1 red to 4 blacks to 16 purples. The purples varied in thorniness from very thorny to almost smooth, while the black caps resembled the Gregg and the red the Cuthbert as regards thorniness. The reciprocal cross, Cuthbert × Gregg,

gave all red raspberries. Crosses were also made between Cuthbert and blackberry, loganberry and raspberry, currant and gooseberry, and European and American gooseberry. The report closes with a statement of the objects sought in breeding corn, cucumbers, egg plant, peppers, garden peas, potatoes, and tomatoes.—*R. Wellington.*

1362. PEASE, M. S. [German rev. of: STAKMAN, E. C., J. H. PARKER, AND F. J. PIEMEISEL. **Can biologic forms of stem rust on wheat change rapidly enough to interfere with breeding for rust resistance?** Jour. Agric. Res. 14: 111–124. *5 pl.* 1918 (see Bot. Absts. 1, Entry 500; 2, Entry 397).] Zeitschr. Indukt. Abstamm.- u. Vererb. 26: 179–180. 1921.

1363. PÉZARD, A. **Numerical law of regression of certain secondary sex characters.** Jour. Gen. Physiol. 3: 271–283. *8 fig.* 1921.—The rate at which the comb of a castrated cock shrinks is expressed by a parabola having the formula $L = l + \frac{1}{2} C (\vartheta\text{-}t)^2$, where L is final length of comb, C a constant for each individual, ϑ duration of shrinkage, l length of comb at some particular time, t. It was also noted that $C\ \vartheta$ is nearly constant.—*H. D. Goodale.*

1364. PICKETT, B. S. **Correlations between fruit and foliage in strawberries.** Proc. Amer. Soc. Hort. Sci. 14: 56–59. 1917 [1918].—A summary of the relationship between (1) the average weight of berries and average area of leaflets, (2) the total production of fruit and total area of the foliage, (3) the number of leaves and the number of berries, is presented for 900 seedlings, the progeny of crosses of 17 varieties of strawberries. The correlation between (1) number of leaves and berries was .4792 ± 0.0022, (2) average area of the leaflets and average weight of fruit 0.28904 ± 0.00456, and (3) total area of foliage and total weight of fruit 0.7503 ± 0.0012. It was concluded that it was not practical to use these correlations as a basis of eliminating strawberry seedlings.—*W. D. Valleau.*

1365. PUNNETT, R. C., AND P. G. BAILEY. **Genetic studies in poultry. III. Hen-feathered cocks.** Jour. Genetics 11: 37–57. *Pl. 7–11, 2 fig.* 1921.—The authors accept for the present MORGAN's theory that hen-feathering in the cock is due to the presence of luteal cells. They regard hen-feathering in cocks to be the result of a single factor, which, however, is distinct from the one that produces the normal hen plumage. The former is transmitted equally to both sexes, the latter only to females. The factor producing hen-feathering in males is dominant, but intermediate forms occur among heterozygotes. These, in their 1st year's plumage, may resemble very closely normal males, but in the succeeding moult take on almost entirely the plumage of the hen-feathered males.—*H. G. May.*

1366. RASMUSON, HANS. **Beiträge zu einer genetischen Analyse zweier Godetia-Arten und ihre Bastarde. [Contribution to a genetical analysis of two Godetia species and their hybrids.]** Hereditas 2: 143–289. *1 pl., 29 fig.* 1921.—Results are described of varietal and specific crosses in *Godetia Whitneyi* and *G. amoena*. The work was begun in 1917 with commercial seed. The procedure involved crosses between types of unknown genotype. Parental plants were selfed in each case. In the event of segregation of selfed plants their progeny was further tested during the next 2 seasons. The progeny of crosses was also carried through to F_2 and in some cases to F_3. The number of differential characters is considerable and some of the phenotypes are highly modifiable, making their separation uncertain. The populations were in general small. The interspecific hybrids were almost completely sterile, though enough F_2 plants were secured in some cases to show that the genes behave in the same manner as in varietal crosses. For these reasons the author's conclusions are put forward in some cases with caution. The characters studied were color, size, and doubleness of corolla, color and shape of leaves, and habit of growth of plant. Heritable differences were demonstrated for all these characters and a factorial analysis proposed for the following: (1) *G. Whitneyi*. (a) *aa* plants have yellow-margined petals; (b) *B* plants in the absence of other dominant color genes have pale violet-colored petals; (c) *C* in place of *B* gives rose varying to nearly white; (d) *D* alone has no effect, but with *B* or *C* produces lilac; (e) *E* produces red petals; (f) *F* with *E* gives red with light-margined petals but alone has no effect; (g) *G* produces a red spot in the middle of the petal; (h) *H* enlarges the set but alone is without effect; (i) *I* gives,

probably with B only, rose-lilac. (2) In *G. Whitneyi* it was shown that *aa* plants have smaller corollas, though it is probable that other genes are also concerned in corolla length. (3) Segregation was shown in this species, but the factors were not definitely determined for light and dark green leaves, long narrow *versus* short broad leaves, and low dense growth habit *versus* taller lax type. The latter is probably a simple genetic difference due to gene R. (4) Linkage relations suggest that the B, E, and G allelomorphic pairs are in the same chromosome pair. The crossover percentage for the B and E pair was figured at 14.3 per cent. C and F genes are thought also to be linked but in a 2nd chromosome pair. (5) In *G. amoena* a pure variety was found with a large spot on the petals not reaching to the base ("Querfleck"), and another with a small basal spot. Types with both spots when selfed gave 1 "querfleck:" 2 double-spot : 1 basal spot. Both types of spots give 3:1 ratio with unspotted *Whitneyi* varieties. The author suggests either multiple allelomorphism or close linkage, preferring for the present the latter. (6) Double is dominant to single (gene U) but is influenced in *G. amoena* by factor L or K concerned with spotting. Basal-spot flowers (*Lg Lg*) are more double than double-spotted ones (*Lg lG*) and these more double than "querfleck" (*lG lG*). (7) No *Oenothera*-like phenomena were found and interspecific crosses behaved like varietal ones in respect to flower color, doubleness of flower, and growth form of plant, at least in so far as the small progenies permit a decision.—*Leonas L. Burlingame.*

1367. RASMUSON, HANS. **On some hybridization experiments with varieties of Collinsia species.** Hereditas 1: 178–185. *1 fig.* 1920.—A white-flowered variety of *Collinsia bicolor* was crossed with the normal type having lilac on the under lip and being whitish on the upper. F_1 plants were lilac, and in F_2 segregation of 9 lilac to 7 white was observed. Green stem was recessive to red, and the F_2 ratio was approximately 9 red : 3 slightly tinged with red : 4 green. An A factor is assumed which produces white flowers and red-tinged stem, and a B factor which causes white flowers and green stem. AB gives lilac flowers and red stem, and ab gives white flowers and green stem. A variegated plant of *C. tinctoria* crossed with the self-colored type gave 3 self to 1 variegated in F_2. One-fourth of the variegated plants were yellow and non-viable. A gene, I, is postulated which increases the amount of green in variegated plants. The yellow plants are assumed to be ii. Spots on the upper lip of the flower of *C. tinctoria* proved to be a simple Mendelian dominant condition.—*A. C. Fraser.*

1368. RAUM. **Weissblühender Rotklee eine "umschlagende Sippe?"** [**White-flowering red clover, an "ever-sporting variety?"**] Zeitschr. Pflanzenzücht. 8: 73–77. 1921.—Seeds of open-pollinated white-flowering heads of red clover produced 0.8 per cent white-flowering plants, presumed to have arisen through geitonogamy, produced seed unguarded but geographically isolated. Of 200 offspring only 11, or 5 per cent, came white. Seed from 48 red-flowered plants descended from white-flowered plants produced white-flowered plants in only 19 of the 48 families to the extent of 41 white to 231 red. Some intermediacy was evidenced by flower color. The author believes that the data warrant the conclusion that white-flowering red clover is an ever-sporting form comparable in some ways to four- and five-leaved ever-sporting strains of red clover. The problem is considered of economic importance. [See also Bot. Absts. 9, Entry 1329.]—*L. R. Waldron.*

1369. REGAN, W. M. **Breeding experiments with dairy cattle.** New Jersey Dept. Agric. Bull. 24. *323–326.* 1920.—The author describes breeding experiments now in progress, the object of which is to determine the value of inbreeding, line-breeding, and out-breeding in improving dairy cattle. It is also planned to attack the questions of "nicking" and inheritance of milk secretion.—*E. Roberts.*

1370. RHODES, ROBERT CLINTON. **Binary fission in Collodictyon triciliatum Carter.** Univ. California Publ. Zool. 19: 201–274. *Pl. 7–14, 4 fig.* 1919.—The author presents a detailed account of *Collodictyon triciliatum*, free-living flagellate reproducing solely by binary fission. An extended discussion is given of its affinities based on the form of mitosis, of which full descriptive account is given.—*R. E. Clausen.*

1371. ROBERTSON, ELIZABETH. **Notes on breeding for increase of milk in dairy cattle.** Jour. Genetics 11: 79–90. 1921.—A study was made of the methods of breeding Kerry cattle in relation to increase in milk and fat production. The conclusion was reached that milk and fat are increased by inbreeding to a male relationship and decreased by breeding to a female relationship. By male relationship the author means "the mating of a bull with a cow which is so related to him that their first common ancestor is a bull." If the first common ancestor is a cow it is called a female relationship.—*E. Roberts.*

1372. SCHIEMANN, E. [German rev. of: (1) CORRENS, C. **Die geschlechtliche Tendenz der Keimzellen gemischtgeschlechtiger Pflanzen.** (**Sex tendency of germ-cells in plants of mixed sex.**) Zeitschr. Bot. 12: 49–60. *2 fig.* 1920 (see Bot. Absts. 8, Entry 1066). (2) WETTSTEIN, F. VON. **Künstliche haploide Parthenogenese bei Vaucheria und die geschlechtliche Tendenz ihrer Keimzellen.** (**Artificial haploid parthenogenesis in Vaucheria and the sexual tendency of the germ-cells.**) Ber. Deutsch. Bot. Ges. 38: 260–266. *2 fig.* 1920 (see Bot. Absts. 9, Entry 777).] Zeitschr. Indukt. Abstamm.- u. Vererb. 25: 255–256. 1921.

1373. SLOCUM, ROB. R. **Standard varieties of chickens. II. The Mediterranean and continental classes.** U. S. Dept. Agric. Farmers' Bull. 898. *27 p., 22 fig.* 1920.—The author gives simple descriptions based on the American Standards of perfection, but does not go into as great detail. The bulletin is intended for the use of small poultrymen and farmers who keep some poultry. Under the Mediterranean classes are described the Leghorns, Minorcas, Anconas, Spanish, and Blue Andalusian; under the continental classes, the Campines.—*H. G. May.*

1374. SMALL, JAMES. **The origin and development of the Compositae. Chap. XI. The origin of the Compositae.** New Phytol. 18: 65–89. *Fig. 41–66.* 1919.—Theories of evolution are discussed under the following headings: Natural selection, mutations, orthogenesis, epharmosis, isolation, and differentiation. The author concludes that "In evolution by orthogenetic saltation, with epharmosis and elimination of the unfit,—we have the best of Darwinism, neo-Lamarckism, neo-vitalism, Mendelism, and the mutation theory." Orthogenetic saltation is looked upon as determining the inner constitution of a species, the expression of that constitution being modified by epharmosis. Mendelian segregation is stated as having most evidence to support it as an originating cause of a large number of taxonomic species or even genera. The Lobelioideae are considered to be the ancestral group from which Compositae have been derived. A picture is given of the transformation of a tropical, arborescent species of *Siphocampylus* to an Andean species with all the essential characters of a *Senecio*. [See also Bot. Absts. 3, Entry 1142.]—*T. H. Goodspeed.*

1375. STIEVE, H. **Verjüngung durch experimentelle Neubelebung der alternden Pubertätsdrüse, von E. Steinach.** [**Rejuvenation through experimental revitalization of senile sex glands, of E. Steinach.**] Naturwissenschaften 8: 643–645. 1920.—Stieve points out the need of caution in accepting STEINACH's results, calling attention to certain contradictory evidence.—*H. D. Goodale.*

1376. TSCHERMAK, ERICH VON. **Beiträge zur Vervollkommnung der Technik der Bastardierungszüchtung der vier Hauptgetreidearten.** [**Contributions to the perfection of the technique of hybridization in the four chief species of cereals.**] Zeitschr. Pflanzenzücht. 8: 1–13. *7 fig.* 1921.—This paper describes the physical conditions of the spikelets of rye, wheat, barley, and oats at the season of flowering. The author gives in some detail the technique used in making cross-pollinations within each sort and the climatic conditions necessary to success.—*F. P. Bussell.*

1377. TUFTS, W. P. **Selection of deciduous fruits.** Univ. California Jour. Agric. 6: 14, 15, 28, 29, 30. 1920.—Practically all deciduous fruits are said to be benefited by cross-pollination. Apples, almonds, cherries, figs, filberts, nectarines, peaches, pears, and plums may be divided into self-sterile and self-fertile groups. Varieties of deciduous fruits best suited to California conditions are recommended.—*T. E. Gaty, Jr.*

1378. UBISCH, G. VON. **Anwendung der Vererbungsgesetze auf die Kulturpflanzen. [Application of laws of heredity to cultivated plants.]** Naturwissenschaften 8: 293–299. 1920.—The application of laws of heredity to improvement of cultivated plants is discussed. The author points out the intimate interrelations of theory and practice. The term Mendelian character is used in a special sense to refer to character differences between individuals and races. Difficulties are met with which are dependent upon the effect of environment on the development of characters, existence of complex factor relations in what appear to be simple character contrasts, and the occurrence of linkage phenomena. Linkage is especially important in practical work because it may greatly increase the difficulty of securing desired combinations of factors. Correlations are physiological and should not be confused with linkage phenomena, which depend upon the location of factors in the same chromosome.—Intelligent plant breeding must take account of biological relations in different plants, particularly features connected with blooming and setting of seed. When plants are propagated vegetatively seed constancy is not necessary, and a highly heterozygous condition may be desirable on account of its stimulating effect. Different treatments are accorded seed plants depending on whether they are self-fertilized, cross-fertilized, or self-sterile. Genetic analysis is most readily accomplished in a self-fertilized plant, and illustrative details are given for wheat, oats, and barley. Rye is mostly self-sterile, consequently breeding to an absolutely homozygous condition is impossible. In potatoes self-sterility, low fertility, and degeneration following self-fertilization are hindrances to success in breeding, but statements in the literature cannot be accepted without reservations. There is a possibility of attaining immunity to disease by crossing with wild species. Degeneration in potatoes should be a subject for future solution. In sugar beets genetic analysis is particularly difficult because of the influence of external conditions. The aim of sugar beet breeding is to combine high sugar content with high weight, a very difficult task because both characters are determined by a series of multiple factors. The sugar beet may be crossed with other beet derivatives.—The possibility of improvement depends upon genetic diversity of species; good characters of whole series of forms may then be gradually combined in one. The origin of germinal diversity is not well understood. The idea of gradual change under the effect of environmental conditions conflicts with present conceptions of the nature of the gene and of changes in it. Fortuitous mutation with subsequent selection of favorable mutations may account for progress, but even so-called mutations may often be cases of complex segregations. Reversion to wild type on crossing is an instance of complex factor interaction, of great theoretical interest because it permits of phylogenetic deductions. Advance in knowledge continually widens the circle of phenomena subjected to genetic experimentation.—*R. E. Clausen.*

1379. VINCENT, C. C. **Results of pollination studies at Idaho University.** Better Fruit 14^3: 11–15. *3 fig.* 1920.—One of the first problems in apple orchard pollination is the detection of varieties inclined to be unfruitful when planted alone. Self-sterility is not a constant character; hence fertility of commercial varieties must be tested locally. Of 50 varieties tested, 18 were found to be self-sterile, 7 self-fertile, and 25 partially self-fertile. In this fruit among varieties of apples, when blossoms are exposed to insect visitation, counts were made on certain branches at flowering time and final counts on June 15 of "fruits set." The percentages for the 4 varieties Wagener, Grimes, Rome, and Jonathan ranged from 46.7 to 76 with an average of 63.6; no counts were made at time of harvest. Had harvest counts been made the author estimates a 50 per cent reduction in percentages, bringing the normal set of fruit to approximately 31.8 per cent. If, under favorable conditions, 31.8 per cent constitutes a normal set of fruit when 2 or more varieties are planted together, the majority of varieties tested for self-fertility would not be productive if planted each by itself in large blocks. Two methods of determining self-sterility were tested: 1st, enclosing unopened blossoms in paper sacks, and 2nd, erecting tents of cheese-cloth over individual trees. The results showed very little difference between the 2 methods. Thermometer readings, within and without the cheese-cloth cages, showed that temperature differences under the 2 conditions were very slight. Seed production is less in self-fertilized fruits than in cross-pollinated fruits. A large number of domestic commercial varieties of apples are self-sterile, and those

that are apparently fertile, or partially so, produce fruits inferior in size to those set under natural conditions. Cross-pollination experiments are necessary to determine the best pollinizers for any commercial variety. A test of 9 varieties in 16 crosses shows a wide variation in results; the percentage ranging from 0 for Grimes × Gravenstein and Wagener × Gravenstein, to 35 for Spitzenburg × Grimes, and 34.5 for Newtown × Jonathan.—In selecting a pollinizer the following points require consideration: 1st, mutual affinity is necessary between varieties planted together; 2nd, the 2 varieties must bloom at approximately the same time; and, 3rd, the varieties should be good pollen-producers.—For existing orchards, grafting over (at least 1 tree in 10) of a variety deficient in pollen production with a variety producing abundant pollen, is suggested. One hive of bees to the acre, especially during the blooming period, would unquestionably increase the normal set of fruit. [See also Bot. Absts. 6, Entry 1164.]—*C. S. Crandall.*

1380. Watson, J. A. S. **A Mendelian experiment with Aberdeen-Angus and West Highland cattle.** Jour. Genetics 11: 59–67. *Pl. 12.* 1921.—Coat, conformation, horns, and color were included in the investigation. No definite information was obtained concerning coat and conformation. Polled and horned characters form a simple Mendelian pair. In the female, the polled condition is completely dominant while in heterozygous males the development of horns is sometimes but not always completely suppressed.—Black and red are allelomorphic, black being dominant. The relation of dun to black and red is not clear. Different hypotheses are discussed.—*E. Roberts.*

1381. Whipple, O. B. **Methods in pure-line selection work with potatoes.** Proc. Amer. Soc. Hort. Sci. 14: 34–38. 1917 [1918].—A general discussion is presented.—*J. P. Shelton.*

1382. Wriedt, Chr. **Albinisme i hester. Borket, hvitborket og gule. [Albinism in horses. Three types of dun involving the albino factor.]** Tidsskr. Norske Landbr. 1918: 396–406. 1918.—Albino horses are not mentioned in the earlier publications on the inheritance of coat color in horses. In the 2 Norwegian breeds of horses, the Gudbrandsdalians and the Fjords, albino individuals sometimes occur. In the present publication it is demonstrated that several types of dun are the heterozygotes of the albino factor. Three such types of dun are recorded. In the 1st case the albino factor reduces the brown or bay color to a type of dun called "borket." In this type of dun the same black markings as those of brown and bay are found. The not-black color is a golden yellow, especially in the summer. The second type, in Norway termed "gul" (yellow), is the heterozygote of albino and chestnut. These individuals lack the black markings, but the skin is pigmented and the hairs are of the same golden yellow color as in the 1st type. In the 3rd type, termed "hvitborket," the albino factor is in combination with a dominant dilution factor which reduces brown and bay to a type of dun called "blak." "Blak" is the same type of color as the one found in the Prevalsky horse. "Hvitborket" hairs have the same black points as bay, but the rest of the hair has a very faded yellow, nearly white, color.—The data presented show a clear-cut segregation of albinos in both the "borket" and the "hvitborket" crosses. "Borket" × "borket" gave 2 brown or bay, 7 "borket," and 2 albinos. Different authors are cited, their data all showing the same kind of segregation. "Hvitborket" × "hvitborket" gave 6 "blak," 2 brown or bay, 18 "hvitborket," and 16 albinos. Brown or bay × albino gave 10 "borket." "Blak" × albino gave 8 "hvitborket." The back-cross "borket" × brown or bay gave 119 "borket," 7 "gul" (yellow), 143 brown or bay, and 7 chestnut. The back-cross "hvitborket" × "blak" gave 25 "hvitborket," 29 "blak," 1 "røblak" (chestnut reduced by the dilution factor), and 1 brown or bay. The data concerning "gul" are scarce. A single cross of albino × chestnut gave "gul." "Borket" × chestnut gave 7 "borket," 4 "gul," and 1 chestnut. "Gul" (yellow) × brown or bay gave 6 "borket," 2 "gul," 9 brown or bay, and 1 chestnut. The mating albino × albino has in Beberbeck given albinos without exception in 200 cases.—The albino color in horses behaves nearly in the same way as does albino in guinea-pigs. Individuals are found which have some pigment on ears, mane, and tail.—*Otto L. Mohr.*

1383. W[right], S[ewall]. [Rev. of: Castle, W. E. **Genetics and eugenics.** *2nd ed., 15.5 × 23.5 cm., 395 p., 7 pl., 155 fig.* Harvard Univ. Press: Cambridge, Massachusetts, 1920 (see Bot. Absts. 7, Entry 1734).] Jour. Heredity 12: 71. 1921.

1384. WRIGHT, SEWALL. [Rev. of: CHILD, CHARLES MANNING. **The origin and development of the nervous system.** *296 p., 70 fig.* Univ. of Chicago Press: Chicago, 1921.] Jour. Heredity 12: 72–75. 1921.—The author points out that Child's book has wider interest than might be inferred from the title, as it deals with some of the most fundamental problems of biology. He criticises the author for making no attempt to bring the facts of genetics into relation to his theory, and for apparently looking on the cell "as an organization in a particular kind of matter determined merely by a surface-interior gradient in relation to external conditions," overlooking the well-established facts of cytology and the genetical evidence for the individuality of the unit factors. The reviewer sees no incompatibility between "the genetical and cytological conception of the cell as an association of independent organisms, living in a relatively large, less specialized mass of protoplasm and controlling the behavior of the whole in response, of course, to external stimuli, ... [and] a simple mechanism of heredity and a simple physiological conception of development such as that offered by Child."—*Geo. H. Shull.*

1385. YAMAGUCHI, Y. **Kurtze Mitteilung über die Beziehung der Aufblühzeit und des Sitzes der Blüte am Rispenaste zum Korngewichte des Reises. [Concerning the time of blossoming and the flower position on the branch to the grain-weight of rice.]** Bot. Mag. Tôkyô 34: 136–139. *1 fig.* 1920.—The paper is preliminary to a fuller one to be published in Vol. 1, Heft 4, 1919, of Berichte des Ohara Instituts für Landwirtschaftliche Forschungen [see following entry.]—*Leonas L. Burlingame.*

1386. YAMAGUCHI, Y. **Über die Beziehung der Aufblühzeit und des Sitzes der Blüte am Rispenaste zum Korngewichte des Reises. [The relation between the time of flowering and the position on the panicle to the weight of the rice seed.]** Ber. Ohara Inst. Landw. Forsch. 1: 451–517. *25 fig.* 1919.—The flowers on the apical branch of the rice panicle are the first to open. The flowers on a single branch open in a definite but not serial order. The order in which they open on the individual branches was 1, (7), 6, 5, 4, 8, 3, 11, 2, 15, ... The branches of the panicle blossom in characteristic basipetal order. This characteristic regularity may be assumed to have a significant relationship to other characters, such as the weight of the seed.—The heaviest seed (both in the entire panicle and in the separate branch) usually develops from flowers opening on the 2nd, 3rd, or later day. The coefficient of correlation between time of flowering and weight of seed ranges from $-.660$ to $-.192$ in 3 varieties studied. A somewhat greater negative correlation was found between weight of glume and time of flowering. Intercomparisons of branches on a panicle showed that the heaviest seeds developed from flowers which opened simultaneously but nevertheless came from flowers which were the first to open on their respective branches.—The heaviest seed is usually the 3rd, 4th, 5th, or 6th from the apex of the panicle branch. On the contrary, the heaviest glume is found on the 1st, 5th, or 6th seed from the branch apex. The average seed weight for the different positions decreases with the progress of the time of blossoming. It may be assumed that there is some definite relationship between the weight of a seed and its position on the branch. The heaviest, lightest, and intermediate seeds generally harmonize closely with the time their respective flowers opened.—The coefficients of the correlation between position and weight of unhulled seeds range from $-.397$ to $-.659$. Since these correlations are somewhat greater than those between the actual blooming time and the seed weight, it is necessary to consider that the ordinal position of the flower on the branch may exert an equal, or greater, influence upon seed weight than the actual blooming period. The investigation shows that the weight of the chaff and the course of blossoming are very closely correlated. In contrast, the correlation is less between the blossoming time and the seed weight. This may be due to something which hinders the development of the apical seed of each branch of the panicle. Factors which determine the seed weight are not easy to define, at least in the rice plant.—*H. S. Reed.*

1387. YEARSLEY, MACLEOD. **Can acquired deafness lead to congenital deafness?** Jour. Laryngol. Rhinol. and Otol. 35: 270–271. 1920.—An account is presented with chart of "an instance in which a family with a history of acquired deafness produced offspring that were

born deaf. It is important to note that the deafness was probably otosclerosis and, therefore, of hereditary character."—*Howard J. Banker.*

1388. Zimmermann, Walter. [German rev. of: Goldschmidt, Richard. **Mechanismus und Physiologie der Geschlechtsbestimmung. [The mechanism and physiology of sex determination.]** *251 p., 113 fig.* Gebrüder Borntraeger: Berlin, 1920.] Zeitschr. Bot. 13: 407–410. 1921.

HORTICULTURE

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(See also in this issue Entries 1147, 1198, 1209, 1291, 1293, 1294, 1314, 1315, 1316, 1322, 1332, 1338, 1361, 1364, 1379, 1543, 1546, 1550, 1585, 1595, 1677, 1682)

FRUITS AND GENERAL HORTICULTURE

1389. Anonymous. **A successful (cacao and coconut) plantation in Trinidad.** Agric. News [Barbados] 19: 249. 1920.—An article in the Port-of-Spain Gazette, July 29, 1920, giving an account of a visit to cacao and coconut estates belonging to Mr. G. G. Brown is abstracted. Of interest is the fact that a system of drastic root pruning, carried out during forking operations, was of great benefit to the cacao fields.—*J. S. Dash.*

1390. Anonymous. **The green lime trade of Dominica.** Agric. News [Barbados] 19: 265. 1920.—A new line of trade is being opened up with Mobile, Alabama, 3576 barrels and 747 boxes of fresh limes having been already shipped. It appears this market favors boxes to barrels, which are in vogue for the New York market, and material has been received for making 20,000 standard boxes of 2 cubic feet each.—*J. S. Dash.*

1391. Alderman, W. H. **The horticultural importance of plant associations.** Proc. Amer. Soc. Hort. Sci. 17: 261–266. 1920 [1921].—A review is presented of the recent work on the influence of one crop on another. The suggestion is made that further work should be conducted with orchard plants to determine the relations of toxicity and plant food requirements.—*E. C. Auchter.*

1392. Babcock, E. B. **Bud selection and the frequency of mutations.** Proc. Amer. Soc. Hort. Sci. 17: 40–44. 1920 [1921].—The problem of bud selection as a means of increasing yields in deciduous fruits is discussed. Although some nurserymen are attempting to select their propagating buds from high-yielding parent trees, it is pointed out that the resulting trees can then be offered only as first-class stock of the variety, but nothing more until it has been proved by performance tests of the budded progeny that the character of high yield is actually transmitted. [See also Bot. Absts. 9, Entry 1294.]—*E. C. Auchter.*

1393. Beach, F. H. **Pruning schools in Ohio.** Proc. Amer. Soc. Hort. Sci. 17: 70–73. 1920 [1921].—Pruning schools are rapidly taking the place of pruning demonstrations in Ohio. In 1919, 2 schools, with an attendance of 35, were held in Lawrence County. In 1920, 28 schools, with an attendance of 532, were held in 8 counties. Marked results have been secured.—*E. C. Auchter.*

1394. Belleford, M. V. **Note sur la culture du cacao à l'Ile de San Thomé. [Notes on cacao culture in the Island of San Thomé.]** Bull. Agric. Congo Belge 11: 67–73. 1920.—Notes on the geography, soil and climatic conditions of the island of San Thomé are followed by a brief discussion of cacao culture. Three parasites of the cacao tree are mentioned, *Phytophthora faberi*, *Heliothrips rubrocincta*, and *Lasiodiplodia cacaoicola*, and methods of control suggested. Statistics are given regarding exportation from the island for the years 1902–1916. Two of the chief plantations, "Porto Allegre" in southern San Thomé and "Rio do Ouro" in the north, are described in some detail.—*Henri Micheels.*

1395. Bioletti, Frederic T. **Permanent demonstration vineyards in California.** Proc. Amer. Soc. Hort. Sci. 17: 73–79. 1920 [1921].—The author presents an outline of the methods used to carry practical information to the growers. Details of the working arrangement with the owners of vineyards are noted.—*H. W. Richey.*

1396. Blair, W. S. **Fruit growing in Nova Scotia.** Proc. Amer. Pomol. Soc. 35: 157–161. 1917 [1919].—The principal fruit districts are confined to the counties of Kings, Anapolis, and Hants, where a total of over 30,000 acres of apples are planted. Most of the crop produced is exported each year. There are 130 apple warehouses throughout the fruit section, 40 of these are owned by companies which have affiliated, forming the United Fruit Companies of Nova Scotia Limited. This company purchases most of the spray materials, fertilizers, seeds, etc., for the different members. Spraying is carefully done. Bearing orchards are valued at $500 per acre. The cost of producing apples before 1917 was estimated at $1.75 per barrel. Most of the crop is packed in barrels, and inspectors enforce a good standard. Varieties most commonly grown are Gravenstein, Ribston, Blenheim, Tompkins King, Northern Spy, Stark, and Ben Davis.—*E. C. Auchter.*

1397. Brierley, W. G., and W. H. Kenety. **Blueberry culture in Minnesota—a report of progress.** Proc. Amer. Soc. Hort. Sci. 17: 243–249. 1920 [1921].—This paper reports work done chiefly with selected plants of the "lowbush" blueberry, *Vaccinium pennsylvanicum.* Since the swamp lowbush blueberry, *V. canadense,* blooms and ripens its fruit a little later, this species has been used for the past 2 seasons. *V. corymbosum* has not been able to withstand the severe winters, but more seedlings and hybrids have recently been obtained from Dr. F. V. Coville for further trial. It was found that 1-year old rooted shoots furnished the best propagation material. A table is included showing the effect of different cultural treatments upon the stand and vigor of plants. After 3 years trial only 3 treatments, cultivating, cultivating and shading, and the 2-inch peat mulching, were retained. Manure proved to be detrimental, probably due to its alkaline nature. As regards effect on vigor and yield it appears that cultivating and peat mulching are about equally satisfactory. The number of berries in the clusters on the cultivated plots was greater than on other plots, and considerably greater than on plants grown in the wild state. The benefits derived from cultivation appear to be greater than those from efforts to renovate wild plantings.—*H. W. Richey.*

1398. Chandler, W. H. **Some responses of bush fruits to fertilizers.** Proc. Amer. Soc. Hort. Sci. 17: 201–204. 1920 [1921].—About $\frac{1}{10}$ acre each of American gooseberries, currants, American red raspberries, black raspberries, and blackberries was planted in 1914. At the beginning applications were made at the rate of 100 pounds of potassium chloride, 400 of acid phosphate, and 200 of sodium nitrate per acre. As the plants grew the applications were gradually increased until in 1920 the plots received treatments equivalent to 300 pounds of potassium chloride, 600 of acid phosphate, and 350 of sodium nitrate per acre. Where manure, tankage, or dried blood was used, amounts were applied furnishing approximately the amount of nitrogen applied to a plot receiving sodium nitrate.—In comparison with corn, planted in a portion of the gooseberry and currant plots where the berry plants were removed, the evidence seemed conclusive that gooseberries showed no response to phosphorus. Since the soil was so poorly adapted to blackberries and red and black raspberries, it was not possible to determine whether or not any of them would respond to phosphorus though certainly none responded strikingly.—In plots of black raspberries and red raspberries receiving nitrogen, the total cane growth was respectively 1.004 and 1.87 times that of plots receiving no nitrogen; the blackberries showed no measurable response. The application of nitrogen benefited the red raspberry much less in yield than in growth, possibly because the variety used (Cuthbert) suckers very readily.—The currants made no measurable response to any element. Gooseberries responded to nitrogen and possibly to potassium, the response to manure being greater than to complete mineral fertilizers. In the case of the Cuthbert raspberry, the response to sodium nitrate seemed to bê greater than to an equal amount of nitrogen in manure, tankage, or dried blood.—*H. W. Richey.*

1399. Church, F. A. **Safeguarding the ripe olive.** Pharm. Era 53: 293–294. *2 fig.* 1920.—An account is given of the laws regulating the packing of ripe olives in California, following several fatal cases of poisoning.—*C. M. Sterling.*

1400. Clark, T. W. **Methods of testing cacao beans.** Agric. News [Barbados] 19: 254–255. 1920.—The article discusses the methods of testing and the demands of buyers, indicating how a bean best suited to the latter is produced. In this connection information is given enabling the planter to make tests for himself and thus secure an indication of the value of his product.—*J. S. Dash.*

1401. Colby, A. S. **Pruning notes on blackberry varieties.** Proc. Amer. Soc. Hort. Sci. 17: 241–242. 1920 [1921].—A brief discussion is given of the general pruning of blackberries in Illinois. Tests were made with 11 varieties in duplicate rows, the laterals in 1 row being headed back severely whereas those in the other were not headed back. The author grouped the varieties as follows: "First, those which carry their cluster-buds well in towards the base of the laterals and well down on the canes; second, those which carry their buds out nearer the tips of the laterals and canes; and, third, those whose buds are scattered fairly well along the production wood." Ward and Lawton, with laterals having from 8 to 14 buds with the outer 5 without fruiting clusters, belong to the 1st class; cutting back the laterals ⅓ results in little reduction in the yield. Early King, Taylor, and Wachusett, with an average of 15 buds to the lateral, belong to the 2nd group. Since the first 3 to 5 buds are not fruitful, pruning off more than ⅓ decreases the yield. Snyder, Ancient Briton, Wilson, Ohmer, Eldorado, and Mersereau, the most vigorous and productive domestic varieties, belong to the 3rd group, in which the cluster buds are fairly evenly distributed along the producing wood. Severity of pruning is more necessary in this group, and, as many of the laterals carry as high as 18 buds, they may be cut back ⅓.—*H. W. Richey.*

1402. Colby, G. E. **California fruits.** Monthly Bull. Dept. Agric. California 10: 35–39. 1921.

1403. Condit, I. J. **Getting the people acquainted with the great American fig.** Associated Grower 1[6]: 11–12. 1920.—The Calimyrna (the Smyrna of California) has a golden yellow color, thin skin, amber pulp, and a rich flavor. It is an excellent fresh fruit product. Caprification is emphasized as an essential detail in the culture of this fig.—*E. L. Overholser.*

1404. Cooper, J. R. **Preliminary report on the effect of fertilizers in apple orchards in the Ozark region.** Proc. Amer. Soc. Hort. Sci. 17: 190–193. 1920 [1921].—A series of plot fertilizer experiments in bearing apple orchards, with 5 complete series of elements used alone and in combinations, 3 series in young orchards not yet in bearing, 2 in bearing peach orchards, and some in vineyards and strawberry fields are being carried on. Nitrogen has given the greatest promise of direct results. In orchards growing on poor, leachy soils the set of fruit was increased from 1½ to 10 per cent, with 40 per cent of the spurs blooming, and from 1 to 5½ per cent, with 81 per cent of the spurs blooming; a larger percentage of the fruit which set was carried to maturity. In fertile heavy soils, or soils which had previously been manured little or no benefit was noticeable in the set. In 1 orchard which had been nitrated in the previous season, as well as manured, the application of more nitrate the following year seemed to decrease the set over that in the unfertilized plot. No effect on the set of fruit was observed from the use of either phosphorus or potash.—Judicious pruning stimulated the effect of nitrogen for a single season. Continued pruning was inadvisable as a method of procuring a successful set of fruit. The author states "Our observations have led us to believe that the whole tree performs as more or less of a unit and that the difference in performance of different parts is due largely to location with regard to food and water supply and other conditions of environment. Our record of spur growth follows very closely the description given by Roberts. It seems to us, however, that there is more mass than individual action and that the performance of different classes of spurs is due largely to location and finally to the available supply of plant food."—The author finds that it is possible to change the performance

of spurs by pruning and by controlling the nitrogen and water supplies. Using the percentage and rapidity of germination of pollen as a standard, the vitality of pollen was found to increase either following a special pruning or the early use of quickly available nitrogen. Less frost injury was found in the sod portion of 1 orchard than in the cultivated part. A distinct relation was found between size of apple and number of contained well-developed seeds. There was a tendency to poorer color of fruit on all nitrogen plots. The fruit also matured somewhat later and was considerably larger in size.—*E. C. Auchter.*

1405. Cox, U. T. **The Rome Beauty apple in Ohio.** Proc. Amer. Pomol. Soc. 35: 187-189. 1917 [1919].—The origin and early history of the Rome Beauty apple is recorded. The first spraying tests in Ohio were made in the author's orchard in 1890. Nitrate of soda for the trees and acid phosphate for the sod have proved beneficial; potash has not been beneficial. Several bud sports of the Rome Beauty have originated on the author's farm.—*E. C. Auchter.*

1406. Cranefield, Frederic. **Cherry culture in Wisconsin.** Proc. Amer. Pomol. Soc. 35: 122-125. 1917 [1919].—Cherries have been growing in Wisconsin for at least 300 years. The first commercial cherry orchard was planted in Door County in 1893. There are now approximately 5000 acres in this county alone. The sour cherry is grown almost exclusively. The methods of cultivation, pruning, spraying, harvesting, packing, and marketing as used in Wisconsin are described.—*E. C. Auchter.*

1407. Cullinan, F. P. **Transpiration studies with the apple.** Proc. Amer. Soc. Hort. Sci. 17: 232-240. 1920 [1921].—In 1918 studies were made on 2 2-year old trees, one severely pruned, the other unpruned. The transpiration data obtained indicated that the pruned tree transpired relatively more water per unit area of leaf surface than the unpruned. Both trees made exactly the same gain in growth during that season, yet the unpruned trees had about 56 per cent greater leaf area than the pruned. Because of the greater leaf area it is probable that the unpruned tree would actually transpire more water than the pruned tree, yet the rate of transpiration per unit area of leaf surface was greater in the latter.—Other studies were made with mature apple trees, and also with pepper plants [*Capsicum*] grown in the greenhouse. The latter were grown under varying conditions of moisture, nitrogen, and pruning. "The data in all cases show the very marked effect of the removal of small portions of the stem and foliage in the reduction of the total leaf surface and the amount of dry matter produced." It is concluded that "the mere passage of water through the plant has no influence on assimilation activity, provided the water supply does not fall below a certain minimum required to maintain the turgor of the cells."—*E. C. Auchter.*

1408. Cunliffe, R. S. **Propagation of some tropical fruits: cultivation of the pawpaw.** Agric. News [Barbados] 19: 246-247, 262-263. 1920.—*Carica papaya* presents many and varied forms. The trees may vary from 8 feet high and 4 inches in diameter to 20 feet high and 2 feet in diameter. The fruits may be oval, roundish, pear-shaped, or oblong, weighing from a few ounces to 25 pounds. When immature, the fruits are green; when ripe, of any shade between green and purple, with much meat or little, many seeds or none. Sexually, the differences are even greater, and on this basis some 12 or 13 forms have been recognized, some of which may change over, under certain conditions, to the opposite sex. Some trees have purely staminate flowers, others purely pistillate. Some bear hermaphrodite flowers, some both staminate and pistillate flowers. Successful cultivation depends on reducing unproductive male trees to a minimum, increasing the producing capacity of bearing trees, and improving the fruits. Usually cultivated from seed, the first of the above objects is attained by a rigid and continual selection of seed. This is continued because types are apt to break up, especially owing to sudden changes of environment. Another method of propagation which has given some success is the grafting of scions of selected stock on young seedlings in very early stages of development. The plants bear in about 12 months from seed.—*J. S. Dash.*

1409. Daniel, Lucien. **À propos des greffes de soleil sur Topinambour. [Concerning the grafts of Topinambour sunflowers.]** Compt. Rend. Acad. Sci. Paris 172: 610-612. 1921.—

A study of the tubercles formed on the stock of grafts of *Helianthus orgyalis* is presented. The number, volume, and weight of these tubercles were ascertained and the inulin content studied. Similar studies were made of the scions of Topinambour grafts on these stocks, and it is concluded that the sunflower is not the only source of the inulin present in these scions.—*C. H. Farr.*

1410. Dorsey, M. J., and J. W. Bushnell. **The hardiness problem.** Proc. Amer. Soc. Hort. Sci. 17: 210–222. 1920 [1921].—The authors give a brief résumé of the years, localities, extent, and types of winter injury to various kinds of dormant fruit trees, together with short discussion of horticultural practices which have developed to mitigate winter injury. In summarizing the experimental work on the rest period of plants the authors state "Evidence seems to indicate that a plant is more susceptible to winter injury after the rest period is broken, although there are indications that there is a killing temperature for all species of woody plants even while in deep dormancy. This temperature is seldom if ever reached for some. The investigations of the rest period to date show an intimate relationship between dormancy and hardiness and also furnish an accurate guide to cultural methods." Various experiments are cited in which the hardiness was tested of the seedlings and cuttings of the same species but collected from the southern central and northern range of the species. It was found that, as a rule, the progeny were progressively less hardy the more southerly their origin. Whitten, working with peaches, has shown that there is no permanent adjustment in the length of the growing season of a variety as there is in a species. The authors conclude "it may be safely assumed, since the species is heterozygous, that the plants of the species in the north are genetically different from those farther south in that only those possessing the factors for hardiness have survived." In discussing the physiological phase of hardiness it appears to the authors that the plant as a whole does not react as a unit but some tissues of the tree are more subject to injury than others. A brief discussion is given of the theories of hardiness advanced by recent investigators.—*H. W. Richey.*

1411. Dunlop, W. R. **A Guatemalan coffee estate.** Agric. News [Barbados] 20: 114, 115. 1921.—This article discusses in a general way the conditions, methods employed, etc., on a coffee estate of 2000 acres situated between the altitudes of 2000 and 5000 feet High grade coffee is produced, and the author thinks this is due to the special conditions of altitude, climate, etc., prevailing.—*J. S. Dash.*

1412. Farmer, L. J. **Are fall- or ever-blooming strawberries a success?** Proc. Amer. Pomol. Soc. 35: 132–137. *Pl. 32, fig. 3.* 1917 [1919].—A description of different fall- and ever-bearing strawberry varieties is given. The origin and history of fall-bearing strawberries is included, and the author believes that they are now past the experimental stage, being a decided success under local conditions in New York.—*E. C. Auchter.*

1413. Gourley, J. H. **The commercial production of the blueberry.** Proc. Amer. Pomol. Soc. 35: 138–144. 1917 [1919].—The geographical distribution of the crop is shown. The New England states, with Maine leading, produce most of the crop in this country. In 1914, 151,636 cases of blueberries were packed in the United States. A good yield is 2000 quarts per acre. Picking privileges and methods of picking are discussed. The lowbush pastures are generally burned over once in 3 years. The best berries are produced on the new vigorous shoots.—*E. C. Auchter.*

1414. Gourley, J. H. **The effect of shading some horticultural plants.** Proc. Amer. Soc. Hort. Sci. 17: 256–260. 1920 [1921].—This paper reports the observations of the effects of shading apple, peach, and plum trees, and various kinds of flowers and vegetables in New Hampshire. During the hottest weather the temperature was always highest in the shade, while in cool weather the temperature in the shade was slightly higher during the day and lower at night than the temperature in the open. The shaded leaves were much larger and much thinner than the unshaded and wilted more rapidly. A difference in structure was also noted. In the trees the growth in the shade was greater in length, more slender, and less

branched. The same was true of the smaller plants, in which, furthermore, the root systems were greatly restricted. It was noted that comparatively few blossoms formed in the shade, but that the plants in the open bloomed normally.—*H. W. Richey.*

1415. GRAY, G. P., AND H. J. RYAN. **Reduced acidity in oranges caused by certain sprays.** Monthly Bull. Dept. Agric. California 10: 11–33. 1921.—The acidity of both Navel and Valencia oranges is greatly reduced when a spray composed of soap, sodium carbonate, sulphur and lead arsenate is applied to the trees, even for 1 season. This reduction in acidity amounts to more than 50 per cent in some cases. The physiological phenomenon involved is not known. The arsenic compound, which seems to be chiefly responsible for the effect, is probably slowly converted, first into a soluble form. The facts do not correlate the reduction of acidity with local absorption of the spray by the fruit, the action of the spray probably being systemic, affecting the whole tree.—*E. L. Overholser.*

1416. GREENE, L. **Orchard soil management studies in Indiana.** Proc. Amer. Soc. Hort. Sci. 17: 185–190. 1920 [1921].—The author believes that soil moisture is one of the limiting factors in orchard production. He suggests that even though nitrates are added to sod orchards, conservation of soil moisture is still necessary. The differences appearing between plots A and B are attributed to soil moisture conditions rather than to plant food conditions alone. The experiments show that growth and production are very closely coordinated. The author states "Under the conditions of the experiments at Laurel, 2 types of orchard soil management have supplied moisture in sufficient quantities to produce sufficient growth to show profitable production. These 2 are clean cultivation with cover crop, and straw mulch applied at the rate of from seventy-five pounds per tree in the early history of the orchard to one hundred and fifty pounds per tree during the later years." Where cultivation can be practiced without erosion, the writer believes it will undoubtedly prove to be, in most cases, the most economical method of soil management. "Under certain conditions of cheap mulching material the straw mulch will undoubtedly prove more economical than will cultivation. It is altogether probable that a sufficient amount of mulching material can be grown between the trees if the entire orchard is fertilized for grass production as shown by Professor Ballou in southern Ohio."—"One of the dangers which confronts the practical orchardist who adopts the sod mulch method, is that it is very easy to neglect the supply of mulch material necessary to properly conserve moisture, and the trees will suffer accordingly. In other words, sod mulch is the system of the careless orchardist, and while when rightly used it will probably produce as good fruit with better color at very near the same net profit per acre, it is a system which needs careful attention to be made successful."—*E. C. Auchter.*

1417. HARDY, F. **The application of fertilizers in orchard cultivation.** Agric. News [Barbados] 20: 74. 1921.—This paper considers a communication from Mr Keys, Asst. Curator of the Dominica Botanic Station, entitled The Necessity for Clear Statements in Regard to the Rate of Applying Artificial Fertilizers in Orchard Fertilization, in which the author makes a plea for the units of weight mentioned in reports of such experiments to be expressed per tree and not per acre, since very often the number of trees per acre is not stated.—*J. S. Dash.*

1418. HEDRICK, U. P. **Report of the National Research Council Committee.** Proc. Amer. Soc. Hort. Sci. 17: 276–279. 1920 [1921].—The committee felt that the American Society for Horticultural Science, through the cooperation of the National Research Council, could well take up the question of establishing arboreal plantings of species of cultivated fruits and nuts in the different parts of the U. S. A. It is planned as a preliminary step to make a survey of living arboreal plant material available for breeding purposes at arboretums and other places in the U. S. A. and Canada. Dr. GALLOWAY was asked to make this survey. The findings will be published either as a government bulletin or as a bulletin from the National Research Council. After this report is secured, future plans for organizing and developing the different arboreal plantings can be made.—*E. C. Auchter.*

1419. Heinicke, A. J. **The seed content and the position of the fruit as factors influencing stippen in apples.** Proc. Amer. Soc. Hort. Sci. 17: 225–232. 1920 [1921].—The author finds: (1) That the early form of stippen, or bitter-pit, occurs more often on lateral fruits of a cluster than on central ones; (2) that the disease is more prevalent on fruit of spurs near the basal portions of the branches; (3) that fruits on branches making a vigorous growth are attacked less; (4) that fruits with few seeds are more susceptible than those with many seeds; and (5) that stippen seems to be associated with earlier maturity. The stippen appearing after the fruit is harvested is more prevalent on many-seeded fruits. The author also noted that the conditions which seemed to retard the development of the early form of stippen often were associated with the presence of water core. It is concluded that "the bitter pit which appears in the mature fruit that is still attached to the tree seems to be associated with conditions favorable for incipient wilting, but unfavorable for an abundant, or even an adequate, supply of nutrients. On the other hand, the form of stippen which does not become manifest until the fruit is harvested, or generally several weeks later, seems to be associated with conditions that favor an abundant or even an excessive supply of water and the other size-producing nutrients." The author believes, however, that the so-called true bitter-pit is probably due to the same causes which bring about the earlier appearing stippen.—*H. W. Richey.*

1420. Higgins, J. Edgar. **Report of the Horticultural Division.** Hawaii Agric. Exp. Sta. Rept. 1919: 16–40. *Pl. 1–6.* 1920.—Report of investigations conducted with Macadamia nuts, avocados, mangoes, papaya (Sola variety), litchi, coffee, vanilla, pineapples, and algaroba.—*J. M. Westgate.*

1421. Howard, W. L. **Use of dust sprays in California.** Proc. Amer. Soc. Hort. Sci. 17: 106–108. 1920 [1921].—Dry sulphur has always been the standard remedy for mildew on grapes. In no other instance has a dry spray proved to be of pratical importance in California as a fungicide, and wet sprays are used almost exclusively for controlling diseases.—Sulphur dust has been found very effective against red spider on almond, peach, and plum trees. It is believed that the heat of the sun slowly volatilizes the sulphur and that these slowly liberated fumes kill the mites. Lately a new dust spray, known as Nicodust, composed of nicotine sulphate in 2, 5, and 10 per cent combinations with kaolin clay as a carrier, has been giving success with certain insects. It was first used against leaf aphis on walnut, a 2 per cent dust proving successful. A 5 per cent Nicodust successfully controlled thrips on prunes, pears, and nursery stock. This dust has not proved effective against red spider, possibly because the liberation of the nicotine fumes is completed in about 3 hours, whereas sulphur fumes are liberated more gradually, continuing for days. Because Nicodust kills by the rapid liberation of nicotine fumes it is necessary, under California conditions, that the dust be applied to the trees during the warm part of the day.—Arsenate of lead as a dust has never been used, except in a very limited way, against such insects as the codling moth; where employed it was not a success. The future development of dry sprays as insecticides seems to lie in the direction of those that give off fumes rather than in the use of arsenicals.—*H. W. Richey.*

1422. Jones, J. **Report on the Agricultural Department, Dominica.** Rept. Imp. Dept. Agric. West Indies 1919–1920: 44. 1921.—Interesting plants in the gardens, and of which some account is given, are: *Baikiaea insignis*, which during 5 months bore from 50 to 100 delicately scented flowers which opened between 4 and 5 o'clock in the afternoon and faded the next morning; *B. Eminii*, *Amherstia nobilis*, *Pongamia glabra*, *Deguelia microphylla*, and *Chenopodium ambrosioides* L. (Mexican tea).—From certain notes on the nurseries it appears that soils are greatly exhausted by the constant growing of lime seedlings, and a simple method of maintaining fertility has been evolved. The beds are 4½ to 5 feet wide, separated by paths 3 to 3½ in width. After the beds are planted, accumulations of weeds, grass, and leaves are placed in the paths, the latter having considerable half-rotted matter by the time the seedlings are removed. The beds for the next crop of seedlings occupy the positions of the former paths. This practice keeps up the fertility of the beds indefinitely so long as sufficient humus is supplied.—Among the economic plants, *Momordica cochin-chinensis* flowered and was hand-

pollinated. The first fruit weighed 3¾ pounds. The seeds of this plant yield an oil of remarkable drying properties; besides, the plant is a very desirable climbing ornamental, quickly covering walls or arbors and producing striking flowers.—It is stated that some of the best flowered mangoes are the poorest shippers. Selection work with mangoes and avocados to supply the Canadian market is urged. Trials with avocados indicate that varieties from the Mexican highlands are not satisfactory for growing on West Indian island coasts. Onion culture is making considerable progress; on one estate some 30,000 pounds were produced last season. It has been proved that onion seed can be produced in Dominica, but for the present planters depend on supplies of Teneriffe seed. Camphor experimentation is still in progress. —Among the principal exports, the lime crop shows an increase of 12,000 barrels over the average annual output for several years prior to 1918. It is pointed out that the Florida lime industry affects but little the green lime trade of Dominica, absorbing, as a matter of fact, only 2 per cent of the Dominica lime crop.—It has hitherto been very difficult to obtain reliable figures as to the cacao production, owing to smuggling to the neighboring French islands. Market conditions having changed, however, the last cacao crop was shipped in the proper way. Thus the figures of export for 1919, 700,387 pounds, valued at $150,000, more closely represents the actual crop figures. On page 19 is given a complete list of the agricultural exports for the years 1917–18–19.—Discussing the present agricultural situation at length, the author urges greater attention to cultural methods, the increased use of green and artificial manures, the regular employment of labor for the benefit of both the laborer and the plantation, the establishment of land settlement schemes for laborers, etc. On page 20 is given a résumé of the plant legislation now in force in Dominica. On p. 21–30 an account is given of the condition of the lime experiment station, with valuable notes as to methods employed; manurial experiments; the comparison between spineless limes budded on sour orange stocks and grown with *Canavalia* for green dressing, common limes similarly budded and grown with *Tephrosia*, common limes similarly budded and grown without green dressings, and common seedling limes clean-weeded; new lines of experimentation, etc. Cacao manurial experiments are presented in tabular form and fully discussed on p. 37–44. It is observed from these that 20 years of trials show that a complete manure is absolutely essential to successful cacao cultivation, and it now remains to determine the effects of various forms of nitrogen, phosphate and potash.—*J. S. Dash.*

1423. JONES, J. **Root pruning of cacao trees for improvement of production.** Agric. News [Barbados] 19: 404. 1920.—It has been noted that poor-bearing cacao trees often present a large and very healthy appearance whereas neighboring heavy-bearing trees appear comparatively undeveloped or less healthy. The question having arisen whether the low yield was not often due to unusual vegetative vigor, 1 of 2 low-yielding trees, growing in a plot of trees yielding 100 pods per tree per annum, was carefully root-pruned. The original average yield of these 2 trees was 25–30 pods per annum. After the pruning the treated tree bore a crop of 78 fully grown pods while the unpruned one beside it bore 14. While the result is not conclusive in itself, it points to a new field for extensive trials, since root pruning would be infinitely easier and possibly more successful than cutting back and budding developed trees.—*J. S. Dash.*

1424. KNOWLTON, H. E. **Methods in apple pollination experiments.** Proc. Amer. Soc. Hort. Sci. 17: 44–47. 1920 [1921].—Attention is drawn to the fact that great care and accuracy should be used in carrying on apple pollination work in the field. A refinement of methods and the elimination of as many sources of error as possible are suggested.—The use of the "bagging" method is questioned as compared with the practice of covering the entire tree with a muslin frame. It is suggested that temperature and light conditions are more abnormal under bags. At least 500 blossoms should be worked in each case, whether cross- or self-pollinations are made. Since weather conditions at blossoming time materially affect the percentage of set, the author states that the results secured on different days or in different years should not be summarized and averaged. As much work as possible should be done in 1 day under the same conditions, and a careful record of the weather conditions should be tabulated and reported as part of the data.—*E. C. Auchter.*

1425. Laffer, H. E. **Pruning of the vine.** Agric. Gaz. New South Wales 31: 655–661. 1920; 32: 119–126, 339–342. *13 fig.* 1921.—The author discusses various methods of pruning, such as the Thomery Spalier system, Bordelais Spalier system, and Cazenave's Cordon system. The method of training the home vine is also discussed.—*L. R. Waldron.*

1426. Maney, T. J., and H. H. Plagge. **Fruit bud production in the apple.** Proc. Amer. Soc. Hort. Sci. 17: 250–256. 1920 [1921].—The paper records a study of fruit-bud production in an Iowa orchard used since 1910 for a study of various cultural methods. The production of fruit buds on 1-year old wood and on spurs of different ages was observed and groupings made accordingly. A correlation was noted between the amount of new growth,—and the consequent development of spurs,—and fruit-bud formation. The conclusion reached is to the effect that, if twig growth and productiveness are related, the logical means of effecting fruitfulness is by proper pruning methods, soil culture and fertilization, use of hardy stock, proper distance of planting, and spraying.—*E. C. Auchter.*

1427. Mantuel, H. L. **Vineyard notes for May.** Agric. Gaz. New South Wales 32: 348. 1921.

1428. Matthews, C. D. **Report of the Division of Horticulture.** Ann. Rept. North Carolina Agric. Exp. Sta. 43: 46–51. 1920 [1921].—A brief statement is presented of cultural studies with apples, peaches, pecans, strawberries, Irish potatoes, sweet potatoes, and cabbage.—*F. A. Wolf.*

1429. Miller, E. Cyrus. **Commercial apple growing in Massachusetts.** Proc. Amer. Pomol. Soc. 35: 172–174. 1917 [1919].—Personal experiences in growing apples in Massachusetts since 1888 are given. Prices received for the crop in different years are shown.—*E. C. Auchter.*

1430. Murrill, W. A. **The papaya, or tree melon.** Sci. Amer. 124: 191, 200. *4 fig.* 1921. —The article describes the species *Carica Papaya.*—*Chas. H. Otis.*

1431. Neer, F. E. **Comparisons between sun-drying and stack-drying.** Monthly Bull. Dept. Agric. California 10: 70–72. 1921.—In stack-drying, fruit should first be exposed to the sun for about half a day in order to get the color desired. The sugar content of sun- and stack-dried products is the same, but the eating quality of the stack-dried product is superior. —*E. L. Overholser.*

1432. Overholser, E. L. **The peach tree after fruit harvest.** Associated Grower 1^6: 5, 6. 1920.—The author quotes scientific facts to support the statement that certain cultural methods should be observed after the fruit is harvested in order to obtain the maximum amount of stored food, a concentrated sap, and the formation of plump fruit buds.—*F. de Villiers.*

1433. Patterson, J. M. **Commercial pecan culture—a new industry.** Proc. Amer. Pomol. Soc. 35: 144–156. *2 pl.* 1917 [1919].—The early history and origin of pecans is discussed. The southern states produce practically all of the commercial crop. The future of the pecan industry is depicted as being very bright. As regards food value in terms of calories, 1.1 pounds of pecans are equal to 1.5 pounds of bacon, 2.45 of smoked ham, 4.1 of porterhouse steak, 4.89 of mutton, or 5.35 of chicken. As a food, pecans are therefore reasonable in price when compared with various meats. It is claimed that pecans are not more subject to insect enemies or diseases than common fruits. Cooperative packing and marketing associations are now being formed in the U. S. A.—*E. C. Auchter.*

1434. Pickett, B. S. **Responses of a young peach orchard to certain cover crops and fertilizer treatments.** Proc. Amer. Soc. Hort. Sci. 17: 193–197. 1920 [1921].—Cover crop and fertilizer experiments were carried on near Olney, Richland County, Illinois. Forty-three major plots, each containing 16 trees, were used. Guard rows between the different plots

were provided for. The orchard was started in 1917 and the experiments begun in the same year. In 1920, a good crop of fruit was produced and yield and growth records were secured. The following observations were made: (1) As compared with clean cultivation, cow peas used as a cover crop, planted July 10–15, were detrimental to the growth and yield of peach trees; (2) the addition of a fertilizer carrying soluble potassium completely corrected the difficulty; (3) the addition of a fertilizer carrying soluble nitrogen partly corrected the difficulty; (4) the addition of a fertilizer carrying phosphorus gave uncertain results; (5) the addition of both nitrogen and potassium somewhat increased the yield of cover-crop plats over clean cultivation plats; (6) rye following cow peas, used as a winter cover, was very detrimental, almost deadly, in effect.—*E. C. Auchter.*

1435. Pole Evans, I. B., Mary R. H. Thomson, V. A. Putterill, and Geo. Hobson. **Further investigations into the cause of wastage in export citrus fruits from South Africa.** Union of South Africa Dept. Agric. Bull. Gen. Ser. 1. *48 p., 54 fig.* 1921.—The investigations include an examination of the methods of handling the fruit and of the channels through which it passes from the orchard to the market. Orchards, packing sheds, railway trucks, cold stores, and box-wood were examined and inoculation experiments carried out with the various fungi found. It is shown, however, that wastage is due to the olive green mould, *Penicillium digitatum*, and to the blue green mould, *Penicillium italicum*. These moulds are apparently incapable of attacking perfectly sound fruits, hence the danger of wounded fruits is pointed out, also the many sources of bruising. Special attention is drawn to the dangerous practice of packing with an excessive bulge. Experimental consignments of fruit, picked, graded, and packed by specially selected men, were put on the London market with very favorable results. The investigations show that with ordinary care and intelligent handling, South African citrus fruits can be placed on the overseas markets with only a negligible amount of waste. The scope and justification for continuing the investigation are pointed out.—*M. R. H. Thomson.*

1436. Popenoe, Wilson. **Tropical fruits.** Proc. Amer. Pomol. Soc. **35**: 196–214. 1917 [1919].—The common and scientific names of many tropical fruits are listed. Brief discussions concerning the names of several fruits are given.—*E. C. Auchter.*

1437. Rees, R. W. **Central fruit packing associations as an extension project.** Proc. Amer. Soc. Hort. Sci. **17**: 80–83. 1920 [1921].—In 1918, at the request of a group of New York fruit growers for aid in marketing fruit, the extension specialist and county agent helped organize a community packing house. The details of the organization were worked out in several meetings with a committee of the growers. In 1918, 6 community packing houses were operated; in 1919, 7 more were added, and in 1920, 12 additional ones were organized. In 1920, 21 of these locals were federated into a central association.—*E. C. Auchter.*

1438. Roberts, R. H. **Experiments upon apple tree nutrition.** Proc. Amer. Soc. Hort. Sci. **17**: 197–200. 1920 [1921].—In nutritional studies with apple trees, the author finds fruitfulness apparently closely related to nutritional conditions. His recent data indicate that blossom-bud formation has a definite relation to the nature and amount of reserve materials in the tree. Yield records are not considered as of as much importance as certain other growth and blossom records of spurs, terminals, laterals, etc.; a suggested list of desirable data is included. It is felt that the relation of growth conditions to fruitfulness is a rather constant matter. Although the internal composition of the tree is important, it is felt that such knowledge is not necessary in a practical measurement of the vegetative or fruiting condition of the tree. The author states "There are correlated growth conditions which answer very well for purposes of experimentation if it is constantly remembered that they are not the factors giving fruitfulness, but are, in turn, only the effects of internal conditions."—*E. C. Auchter.*

1439. Rogers, A. J. **Sweet cherry culture.** Proc. Amer. Pomol. Soc. **35**: 118–121. 1917 [1919].—The author gives his experience in the growing, harvesting, packing, and marketing of cherries.—*E. C. Auchter.*

1440. Taft, L. R. **Commercial cherry culture.** Proc. Amer. Pomol. Soc. 35: 106–118. 1917 [1919].—Statistics from the 1910 census are used to show the number of trees and size and value of the cherry crop in the 7 leading states. A map of the Michigan fruit belt is given with data on the effect of Lake Michigan on the land temperature. Recommendations are made for the proper soil and site for orchards, age of trees for planting, best varieties, and cultural treatment. The proper methods of harvesting and marketing the crop are discussed, together with the extent of the canning industry in Michigan. It is also suggested that sour cherries could profitably be grown in Massachusetts and other New England states.—*E. C. Auchter.*

1441. Terry, H. B. **Pruning of deciduous trees.** Jour. Dept. Agric. South Africa 2: 268–274, 358–371, 457–461. *Fig. 7–27.* 1921.

1442. Tribolet, J. **Mangoes, pawpaws, and avocado pears.** Jour. Dept. Agric. South Africa 2: 338–339. 1921.

1443. Tufts, W. P. **Factors in pruning the bearing peach.** Associated Grower 1^{10}: 36–37. 1920.

1444. Turner, A. G. **Citrus industry. Report on visit to California.** Rhodesia Agric. Jour. 18: 142–166. *6 pl.* 1921.

1445. Vandervort, H. S. **A demonstration community packing house as an extension activity.** Proc. Amer. Soc. Hort. Sci. 17: 83–86. 1920 [1921].—A demonstration community packing house was constructed at state expense at Inwood, West Virginia, in 1920. During the first season (1920) 108 cars were shipped from the plant. Growers were taught the great value of proper spraying and packing as a prerequisite for successful marketing.—*E. C. Auchter.*

1446. Waring, J. H. **The probable value of trunk circumference as an adjunct to fruit yield in interpreting apple orchard experiments.** Proc. Amer. Soc. Hort. Sci. 17: 179–185. 1920 [1921].—Correlation studies were made between the inches gained in trunk circumference and the pounds of fruit produced in several Pennsylvania orchards where fertilizer experiments had previously been carried on. In addition, the coefficients of variability for circumference and yield were determined.—"In-as-much as trunk circumference records used in conjunction with records of the production of fruit, have enabled us to reach certain truths that had not been discovered by our study of production records alone, we conclude that trunk circumference records do have a decided value which may closely approach the value of the yield records themselves as an aid to the correct interpretation of results in apple orchard experiments."—*E. C. Auchter.*

1447. Webb, Wesley. **Progress of pomology on the Delaware-Chesapeake peninsula.** Proc. Amer. Pomol. Soc. 35: 182–186. 1917 [1919].—The early history of fruit growing in Delaware is given. Attention is called to the fact that the Peninsula leads the world in strawberry production. The peach fertilization experiments of C. A. McCue, which demonstrate the value of nitrogen in peach orchards, are reviewed. The apple varieties commonly grown are Stayman Winesap, Yellow Transparent, Early Ripe, Williams Early Red, Jonathan, Grimes, Rome Beauty, and Paragon. Apple grading laws and fruit sizing machines have helped to raise the standards of packing.—*E. C. Auchter.*

1448. Wester, P. J. **Plant propagation and fruit culture in the tropics.** Bur. Agric. Philippine Is. Bull. 32. *134 p., 23 pl.* 1920.—The bulletin is a general manual covering the field indicated by the title. While this publication applies primarily to the subjects in the Philippines, much of the data assembled are applicable to other tropical countries, and it should be of great value to all residents in the tropics who are interested in the subject.—*E. D. Merrill.*

1449. Wester, P. J. **The breadfruit.** Philippine Agric. Rev. 13: 221–229. *Pl. 1-4.* 1920.—A plea is made for the more general utilization of this important food plant. Directions are given for propagating the seedless form.—*E. D. Merrill.*

1450. Wester, P. J. **The coconut palm, its culture and uses.** Bur. Agric. Philippine Is. Bull. 35. *73 p., 23 pl., map.* 1921.—The bulletin is a general publication with a special view to conditions existing in the Philippines in reference to the culture of the coconut palm. —*E. D. Merrill.*

1451. Wester, P. J. **The cultivation and uses of roselle.** Philippine Agric. Rev. 13: 89–99. *Pl. 1-4.* 1920.—A plea is made for the more general utilization of this plant, *Hibiscus sabdariffa* Linn.—*E. D. Merrill.*

1452. Wester, P. J. **The preservation of tropical fruits.** Philippine Agric. Rev. 13: 173–185. *Pl. 1-4.* 1920.—General directions are given for preserving the more common tropical fruits with a view to popularizing their use among Caucasian residents in the tropics.—*E. D. Merrill.*

FLORICULTURE AND ORNAMENTAL HORTICULTURE

1453. Anonymous. **Native plants at the National Botanic Gardens. No. 6. Greyia Sutherlandi. No. 7. Kniphofia sp.** South African Gard. 11: 81–131. *2 fig.* 1921.

1454. Boynton, Kenneth R. **Ceratostigma plumbaginoides.** Addisonia 5: 45, 46. *Pl. 183 (colored).* 1920.—The species is a perennial herb, native of China. It has been in cultivation for the past 50 years and is a desirable border plant.—*T. J. Fitzpatrick.*

1455. Boynton, Kenneth R. **Monarda media.** Addisonia 5: 39. *Pl. 180 (colored).* 1920.—This mint is a native of northeastern U. S. A. and has been in cultivation nearly 3 centuries in the U. S. A. and Europe.—*T. J. Fitzpatrick.*

1456. Cox, Geran N. **Raising hybrid rhododendrons.** Gard. Chron. 69: 126–127. 1921. —The author states that he has seen at least 53 species on the Burmese-Chinese border and that at least 250 new species have been discovered in eastern Asia within the last 10 years. There are an enormous number of existing hybrids, and at least 50 per cent of these are not cultivated at Caerhays. He suggests a central authority like the Rhododendron Society to classify and interpret them for gardeners.—*P. L. Ricker.*

1457. Morris, Robert T. **Notes on nut bearing coniferous trees.** Proc. Amer. Pomol. Soc. 35: 156–158. *2 pl.* 1917 [1919].—Descriptions are given of the nuts and other bi-products of several nut-bearing coniferous trees. It is suggested that, because of various economic features, it is not improbable that farmers 1000 years from the present time will include nut-bearing pine trees among their standard crops.—*E. C. Auchter.*

1458. Mottet, S. **Les Benoites. [Geums.]** Revue Hort. 92: 160. *1 pl (colored).* 1920.—The 2 varieties, Mrs. Bradshaw and a similar large-flowered, double, scarlet form of *Geum coccineum*, the orange flowered *G. Heldreichii* and its variety *splendens*, which has clear yellow flowers, are most generally useful. *G. montanum*, *G. pyrenaicum*, *G. triflorum*, and *G. reptans* are useful in semi-shaded situations in rockeries; all are easily propagated.—*E. J. Kraus.*

1459. Nash, George V. **Clethra barbinensis.** Addisonia 5: 41. *Pl. 181 (colored).* 1920. —The species is a shrub or small tree, native of eastern Asia, which propagates readily in moist peaty or sandy soil.—*T. J. Fitzpatrick.*

1460. Nash, George V. **Crataegus phaenopyrum.** Addisonia 5: 33. *Pl. 177 (colored).* 1920.—This hawthorn is a native of southeastern U. S. A. It is highly ornamental because of the abundance of flowers, highly colored fruit, and autumnal coloring of the leaves. It was early cultivated in Europe and to a limited extent in the U. S. A.—*T. J. Fitzpatrick.*

1461. Nash, George V. **Solidago rugosa.** Addisonia 5:43,44. *Pl. 182 (colored).* 1920.—The species is a golden-rod of easy culture, preferring open sunny places, and native of eastern North America.—*T. J. Fitzpatrick.*

1462. Nash, George V. **Stephanandra tanakae.** Addisonia 5: 37. *Pl. 179 (colored).* 1920.—This shrub of the rose family is native of Japan. It is of easy culture and is well adapted to shrub borders or rocky banks.—*T. J. Fitzpatrick.*

1463. Nash, George V. **Viburnum sieboldii.** Addisonia 5: 35, 36. *Pl. 178 (colored).* 1920.—The present species is a shrub or small tree, native of Japan, recently introduced into the U. S. A. It is suitable as a background for small shrubs.—*T. J. Fitzpatrick.*

1464. Proschowsky, A. Robertson. **Palms of the Riviera.** Gard. Chron. 69: 127–128. *Fig. 56.* 1921.—Next to *Phoenix canariensis*, the so-called California Fan-leaved palm, *Washingtonia filifera*, is the commonest. While introduced to the Riviera less than 40 years ago, it is of such rapid growth that specimens are now found 15 m. or more high and trunk 3 m. in circumference. The plant is briefly described. *Washingtonia robusta*, introduced about 10 years later, grows about twice as rapidly, being the most rapidly growing of all palms for temperate climates. The variety *gracilis* grows less rapidly and has smaller leaves, however of a better green color. *W. filifera* has proved absolutely hardy notwithstanding that on Dec. 17, 1920, the most severe frost known on the Riviera for 100 years or more occurred.—*P. L. Ricker.*

1465. S., F. L. **Clematis jeuneiana.** Gard. Chron. 69: 159. 1921.—This species is related to *C. armandii*, *C. pavoliniana*, and *C. meyeniana*. It was previously illustrated [Gard. Chron. 69: 135. *Fig. 59.* 1921] and considered by the author to be a garden hybrid, being exactly intermediate between *C. armandii* and one of the other 2 forms. The name has been accepted by the Royal Horticultural Society. The editors also point out the close resemblance in sound of this name to *C. jouiniana*. Cecil Hanbury also states that the material is probably a seedling raised at La Mortola from seeds of *C. armandii* sent to his father from western China by E. H. Wilson, which he sent his brother-in-law, Capt. B. H. B. Symonsjeune.—*P. L. Ricker.*

1466. Small, John K. **Grossularia curvata.** Addisonia 5:47,48. *Pl. 184 (colored).* 1920.—This gooseberry is a native of Georgia and Alabama. It was discovered near Atlanta, Georgia, in 1905, and has recently been introduced into cultivation.—*T. J. Fitzpatrick.*

1467. Turbat, E. **Les belles roses nouvelles ou récentes. [Good roses new or recent.]** Revue Hort. 92: 156–157. 1920.—The following varieties are specifically noted: Everblooming climbers; Climbing Marquise de Sinety, Climbing Richmond, Climbing Sunburst, each a bud variation of the standard variety of the same name; small-flowered everblooming multiflora climbers, Climbing Orléans rose, Ghislaine de Féligonde, Marie Jeanne; climbing, non-everblooming hybrids of Wichuraiana, Casimir Moullé, Coronation, Paul's Scarlet Climber, Paul Noël, Petit Louis, Source d'Or, Troubadour; climbing, non-everblooming multiflora, Crimson grandiflora, Louis Sauvage, White Merville (White Tausendschön). The name of the introducer, date of introduction, and short description are given for each variety.—*E. J. Kraus.*

VEGETABLE CULTURE

1468. Bushnell, John W. **The fertility and fruiting habit in Cucurbita.** Proc. Amer. Soc. Hort. Sci. 17: 47–51. 1920 [1921].—Work at the Minnesota Experiment Station during the years 1915–1920 has definitely proved that hubbard squash (*Cucurbita maxima*) is self-fertile. No inherited self-sterility was encountered during the progress of the experiment. In a study of the influence of weather, time of day, and stage of flower development at time of pollination upon set of fruit, it was found that successful pollinations may be made "(1) under a wide range of weather conditions, (2) at any time of day, (3) at any time during the period that the flowers are open." Abortions were numerous in hand-pollinated flowers, but these

could not be correlated with the above factors. Usually the first appearing pistillate flower aborts, then the next flower or flowers are followed by a series of abortions, which in turn are followed by another set. This periodic setting of fruit was also noted in the only open-pollinated plant under observation.—*H. A. Jones.*

1469. Lavender, W. **The French method of growing asparagus.** Gard. Chron. 69: 129. 1921.—The ground is first plowed to a depth of 12–14 inches in autumn after thorough dressing with manure. The surface is left rough during the winter. The best results are obtained in sandy loam. In heavy lands, a large quantity of gritty soil should be added. Reliable stock is essential and one of the largest growers never plants roots over 1 year old as they make better growth than older roots. Cutting can begin cautiously the 3rd year after planting, but only 2 or 3 stems are taken from each stool. When the stools are ready for planting, the roots are spread out in a shallow trench and covered with not over 2 inches of rich compost. During the first 2 seasons catch crops are planted between the rows but before the 3rd spring the roots are earthed up with little hillocks 1 foot high. Plants are placed 3–4 feet apart according to soil and amount of manure applied. Fresh manure is not necessary each season, but the largest stalks are secured by good fertilizing. In the vicinity of Paris, road sweepings are applied. If the stalks are preferred green rather than blanched, only a small amount of soil is placed over the stools.—*P. L. Ricker.*

1470. Lloyd, J. W. **The effect of "nipping" muskmelon vines.** Proc. Amer. Soc. Hort. Sci. 17: 126–128. 1920 [1921].—Nipping of the terminal bud of muskmelon vines under field conditions in Illinois was found to be impracticable, both from the standpoint of earliness and total production. In an average of 8 tests the nipped vines produced .99 pounds per hill of early melons and the vines not nipped 1.02. The average total yield from nipped vines was 3.14 pounds per hill while the vines not nipped produced 3.49. The author concludes that earliness and productiveness in muskmelons may better be promoted by liberal fertilizing and careful tillage to encourage vigorous vine growth than by nipping vines to force the formation of laterals.—*H. A. Jones.*

1471. Rapp, C. W. **Some important factors in snap bean production.** Proc. Amer. Soc. Hort. Sci. 17: 116–119. 1920 [1921].—Work at the Oklahoma Agricultural Experiment Station has shown that bacterial blight of snap beans, caused by *Bacterium phaseoli*, can be controlled by planting aged seed on disease-free soil. Infected seed stored for 2 years and planted on disease-free soil produced disease-free plants. The germination average of 4 varieties of snap beans under field conditions after 1, 2, 3, 4, and 5 years' storage was 92, 91, 70.5, 58, and 22 per cent respectively.—*H. A. Jones.*

1472. Wellington, R. **Report on vegetable investigations being carried on by experiment stations and similar institutions.** Proc. Amer. Soc. Hort. Sci. 17: 267–275. 1920 [1921].—A compilation is presented of some of the more important vegetable experiments being conducted in the U. S. A. and Canada. The author has divided the field, grouping projects of similar nature under the same head, as follows: (1) Rotation and fertilizer experiments; (2) soil composting; (3) cultural methods; (4) pruning, training, and suckering; (5) study of plant variations, habits, and adaptations; (6) breeding and selection; (7) pollination studies; (8) use of electricity; (9) cost of production studies; (10) degeneracy of white potatoes and disease studies; (11) storage investigations; and (12) test of varieties.—*H. A. Jones.*

HORTICULTURE PRODUCTS

1473. Bentley, C. M. **Problems confronting the canning industry.** Monthly Bull. Dept. Agric. California 9: 643–649. 1920.

1474. Christie, A. W. **Efficiency in dehydration.** Monthly Bull. Dept. Agric. California 10: 75–82. 1921.—The author treats in detail the various factors concerned in dehydration of fruit and points out the channels for economy in each of the main factors. The preparation of fruit for dehydration,—sulphuring, lye-dipping, etc.,—and the processing and packing of the dried product are fully discussed.—*E. L. Overholser.*

1475. Christie, A. W. **Some observations in the dehydration of apricots, peaches, and grapes.** Monthly Bull. Dept. Agric. California 10: 94–95. 1921.—The formation of "air zones" in the tunnel causes lack of uniformity in drying. This can be avoided by increasing the speed of air flow through the tunnel. Screen trays are inadvisable because of the corrosive action of sulphur fumes on the metal.—*E. L. Overholser.*

1476. Cole, W. R. **Extension work in horticultural manufactures in Massachusetts.** Proc. Amer. Soc. Hort. Sci. 17: 95–98. 1920 [1921].

1477. Cruess, W. V. **Observations in the evaporation of pears, prunes and figs.** Monthly Bull. Dept. Agric. California 10: 88–93. 1921.—Locality is a factor in the suitability of pears for evaporation only in so far as it causes a difference in the sugar content of the fruit. The fruit of highest sugar content yields dried products best in color, texture, and flavor. The control of temperature and relative humidity is important, especially in the case of pears. There is no noticeable difference in the yield of dried product from sun drying and evaporation. —*E. L. Overholser.*

1478. Davies, S. M. **Loss of citric acid in limes and lime juice.** Agric. News [Barbados] 20: 75. 1921.—The author made tests with sets of 50 limes of various degrees of ripeness to determine the loss of citric acid in rotten fruit. The limes were hand-pressed, the juice of each set measured and acidity determined. Calculated in terms of citric acid per barrel, the results were as follows: Ripe yellow limes, 5.3 pounds, yellow green limes 4.9, overripe limes 4.6, green limes 4.4, and mushy rotten limes 1.7. To determine the losses of citric acid on storing lime juice, 200 pounds, fresh from the mill and stored in a half tub to a depth of 11–12 inches, were allowed to stand under cover; the scum was not disturbed except in lifting the tub on and off a scale at frequent intervals. After 19 days the juice had lost 16 pounds by evaporation and the acid was reduced from 12.1 to 11.3 ounces equivalent to 10.4 ounces of the original volume. This represents a loss of 1.7 ounces of citric acid per gallon, or 14 per cent of the original acid content. The scum showed a thick layer of *Saccharomyces mycoderma,* —an active reducer of citric acid,—accompanied by a considerable growth of bacteria.—*J. S. Dash.*

1479. Jones, B. J. **A successful co-operative evaporating plant.** Monthly Bull. Dept. Agric. California 10: 82–85. 1921.—Certain details in pre-treatment of fruit for dehydration to secure attractive products are mentioned, as, for instance, a certain amount of peeling is essential to prevent the "curling" of the fruit.—*E. L. Overholser.*

1480. Swett, F. T. **Relation of fruit by-products to horticulture.** Monthly Bull. Dept. Agric. California 10: 66–70. 1921.—The author reviews the field of possibilities of fruit products in California, and lays stress on the economic importance of solving the several problems confronting the farmer and manufacturer of to-day.—*E. L. Overholser.*

MORPHOLOGY, ANATOMY, AND HISTOLOGY OF VASCULAR PLANTS

E. W. Sinnott, *Editor*

(See also in this issue Entries 1133, 1181, 1208, 1256, 1258, 1331, 1385, 1386, 1414, 1552)

1481. Anonymous. **A plant that feeds on animals.** Sci. Amer. Monthly 3: 218. *Fig. 1–3.* 1921.—A description is given of the mechanism of the bladders of *Utricularia vulgaris.*—*Chas. H. Otis.*

1482. Bouygues, H. **Considerations sur l'endoderme.** [Considerations on the endodermis.] Compt. Rend. Acad. Sci. Paris 172: 332–335. 1921.—Petioles, rhizomes, stems, and leaf veins were studied. The author concludes that the endodermis cannot be considered as a constant anatomical feature delimiting the cortex from the fibro-vascular system.—*C. H. Farr.*

1483. BRADLEY, CORNELIUS BEACH. **The phyllotaxy of Phoenix canariensis.** Torreya 21: 37-44. *Pl. 1-2, 1 chart.* 1921.—A study of ornamental specimens of *Phoenix canariensis* grown in and about Berkeley, California, shows that the leaf arrangement is not of a single and stable pattern. Each tree has passed through several distinct phases of phyllotaxy. Three zones representing regular patterns, the 5-, 13-, and 34-ranked, are recognized, and the intervals between are occupied by 2 groupings not belonging to any of the ordinary alignments. The interfoliar arc is gradually changed so as to build up these transitional formations, causing the vertical ranks to swerve in the direction of the primary spiral. This rotation of the pattern is continued until some one of the secondary ranks becomes vertical, after which another regular pattern begins. The chart illustrates the sequence of patterns in the 5 phyllotactic zones. —*J. C. Nelson.*

1484. BRIQUET, J. **La structure foliaire des Hypericum à feuilles scléromarginées. [Foliar structure of Hypericum species having leaves with indurated margins.]** Compt. Rend. Soc. Phys. et Hist. Nat. Genève 36: 75-79. 1919.—In certain species of *Hypericum*, the leaves are reinforced along their margins by a thickening that unites with the veins in a way suggesting that it constitutes a portion of the fibro-vascular system. Three species, *H. pimelaeoides* Pl. and Lind, *H. cordiforme* St. Nil, and *H. connatum* Lamk. were studied to determine whether such a condition actually occurred. The thickenings were found to be composed in some cases of an exaggerated development of epidermal covering; in other cases, of greater development of collenchyma. The function appears to consist in permitting the leaf to retain its form during periods of intense transpiration and to resist tearing.—*Charles Drechsler.*

1485. BRIQUET, J. **Les trichomes foliaires des Centaurées Phrygiées. [The foliar trichomes of species of Centaurea.]** Compt. Rend. Soc. Phys. et Hist. Nat. Genève 36: 96-102. 1919.—The hairs of *Centaurea* spp. consist of 2 parts; the foot, composed of 2 or more relatively broad cells, and the flagellum, composed of a single elongated slender cell, the contents of which dies soon after its development. The flagellum is often early caducous, leading to a variety of conditions described as harsh, hirsute, etc., although where it remains attached a tomentose condition obtains. The shedding of the flagellum is related to a fold along its base. Trichomes are described in detail for *C. procumbens* Balb., *C. Jordaniana* Godr. and Grev., *C. pectinata* L., *C. uniflora*, *C. phrygia* L. emend., *C. rhaetica* Moritzi, *C. trichocephala*, *C. hyssopifolia* Vahl., *C. linifolia* Vahl., and *C. antennata* Duf. In general, 3 types may be distinguished, 1 with a cylindrical foot, a 2nd with a conical foot, and a 3rd with the foot irregular. From an ecological standpoint the trichomes serve to reduce evaporation while the leaf is young by surrounding the leaf in a dead air space confined within the cottony or tomentose layer formed by the flagella.—*Charles Drechsler.*

1486. CAMPBELL, DOUGLAS HOUGHTON. **The gametophyte and embryo of Botrychium obliquum Muhl.** Ann. Botany 35: 141-158. *Pl. 7, 11 fig.* 1921.—The gametophyte of *Botrychium obliquum* is similar to those of other species of the genus. The embryo, however, differs in several important respects from those of the other 2 species, *B. Lunaria* and *B. virginianum*, which have been studied and which with *B. obliquum* represent the 3 types of adult sporophytes found in the genus. It differs in the endogenous origin of the root, in the bipolar arrangement of cotyledon and root, and especially in the presence of a suspensor. The embryo is in fact much more like those of some species of *Ophioglossum* and *Danaea* than it is like those of other species of *Botrychium*. It has previously been shown that the embryos of *B. Lunaria* and *B. virginianum* are very different from each other. The author believes that if further investigation shows that other species of the Ternatum group agree with *B. obliquum* in regard to the embryo, there is ample reason for separating off this section as a new genus, and also that *B. virginianum* differs sufficiently from the other species to deserve generic rank. The present genus would thus be divided into 3. The development of the embryo, including the apical regions of stem, cotyledon, and root, as well as the vascular system, is worked out in detail.—*W. P. Thompson.*

1487. COLLINS, MARJORIE I. **On the structure of the resin-secreting glands in some Australian plants.** Proc. Linn. Soc. New South Wales 45: 329-336. *Fig. 1-12.* 1920.—A descrip-

tion is given of the occurrence and development of glandular hairs in *Dodonaea viscosa* Linn., *Acacia rupicola* F. v. M., *A. armata* R. Br., *A. pycnantha* Benth., A. *verniciflua* Cunn., *Ixodea achilleoides* R. Br., *Helichrysum semipapposum* De Cand., *Humea cassiniacea* F. v. M., *Myoporum serratum* var. *insulare* R. Br., *Myoporum serratum* var. *viscosum* R. Br., and *Eremophila latifolia* F. v. M. The facts observed throw light upon the structure of the mature gland and are of systematic value.—*Eloise Gerry.*

1488. Fletcher, J. J. **Presidential address.** Proc. Linn. Soc. New South Wales 45: 1–47. *Pl. 1–8.* 1920.—On pages 24–47 the author discusses The Correct Interpretation of the So-called Phyllodes of the Australian Phyllodineous Acacias. It is suggested that the Australian phyllodineous Acacias should be distinguished from ordinary "phyllodes," (phyllodium = "a petiole usurping the form and function of a leaf-blade," Gray), although this definition was originally intended to apply to the flattened leaf-substitutes of these plants. In the Acacias these structures are neither cladodes nor phylloclades as these terms are currently defined. The author, having determined this, proposes the name Euphyllodineae since the so-called euphyllodes of the Australian Acacias are more than simply flattened petioles. Rather they are considered vertically flattened primary leaf axes or common petioles, with pinnae suppressed, which have usurped the form and function of leaves. The leaf development is traced through the seedling stages, species are compared and illustrated, and analogies with other existing bipinnate species discussed. The incorrectness of current ideas about phyllodes is due to: (1) Neglect to determine the mode of succession of the pairs of pinnae in the development of the bipinnate leaves; (2) non-recognition or disregard of the meaning and significance of the presence of Bentham's "seta terminalis" or "recurved or excurrent point" of the common petiole or of its distal component, the rhachis, due recognition of which, especially in seedlings with only 1 pair of pinnae, is the key to the understanding of the euphyllodia; (3) failure to take into account the fact that the petioles or apparent petioles of known Australian bipinnate Acacias are short relative to the length of the entire primary leaf-axes or common petioles whereas the so-called phyllodes are longer than the petioles. Reversion-foliage, its characteristics and its absence in several species, is discussed and figured.—*Eloise Gerry.*

1489. Hochreutiner, B. P. G. **Le carpocratère, un nouvel organe du fruit des Malvacées. [The carpocrater, a new organ of the fruit of Malvaceae.]** Compt. Rend. Soc. Phys. et Hist. Nat. Genève 36: 80–81. 1919.—The author found in all species of *Cristaria* a cup-like structure at the base of the fruit, the function of which seems to be first protective, and then to facilitate the dissemination of the seed. This structure, which has not been mentioned before, is designated as a *Carpocrater.*—*Charles Drechsler.*

1490. Holmes, M. G. **A contribution to the study of water-conductivity in sycamore wood.** Ann. Botany 35: 251–268. *13 fig.* 1921.—This paper is a continuation of studies [see Bot. Absts. 3, Entry 1109] on the constitution of the wood of shoots of various species in relation to their efficiency in the conduction of water and deals with the sycamore (*Acer pseudoplatanus*). The wood of the 1st year shows a general similarity to those previously studied. The area of the wood in transverse section, the water conducting area in this wood, and the total number of water conducting elements all show, as in previous cases, a simple decline from base to apex. The specific conductivity rises and then falls, and its value is in general near that of hazel and higher than that of ash. The author made observations also on 2nd and later annual rings finding less variation in specific conductivity than in 1st year wood; also the specific conductivity is somewhat lower in value because the vessels are less abundant though wider.—*W. P. Thompson.*

1491. Jeffrey, Edward Charles, and Ray Ethan Torrey. **Transitional herbaceous dicotyledons.** Ann. Botany 35: 227–250. *Pl. 11–13, 5 fig.* 1921.—Bailey and Sinnott have criticized the theory that the herbaceous type in dicotyledons has been evolved from the arboreal type by the formation of large rays in relation to the entering leaf-traces, maintaining that it was in large part merely the result of the progressive thinning of the vascular cylinder. The present article is in reply to their criticisms, contradicting many of their statements of

fact as well as their conclusions and supporting the original theory. Special care is taken to advance evidence that the large rays in many herbs are subtended by leaf-trace bundles since a statement that this condition is rarely found constituted the chief criticism of the theory. A comparison in regard to ray conditions is made between nearly related trees and herbs in a wide variety of natural groups, including Malvales, Urticales, Ranales, Leguminosae, Scrophulariaceae, and Compositae. From the facts brought out it is concluded that a practically never-failing distinction between trees and the aerial axes of woody herbs is the formation in the latter of large rays about the incoming leaf-traces, these rays being well-developed radially but only slightly extended vertically. In less woody herbs the foliar rays become reduced radially because of the thinning of the woody cylinder but at the same time become elongated vertically. The vertical extension results in the division of the cylinder into a series of separate strands. Finally, in the extreme herbaceous condition the woody cylinder is thinned to such a degree that the radial extension of the foliar rays is eliminated. This condition is associated with a great development of those portions of the ray on each side of the leaf-trace.—*W. P. Thompson.*

1492. Maillefer, Arthur. **Les mouvements hygroscopiques des rameaux de l'ombelle de Daucus Carota L. [Hygroscopic movement in the branches of the umbel of Daucus Carota.]** Bull. Soc. Vaudoise Sci. Nat. 52: 385–394. *Fig. 1–10.* 1919.—The hygroscopic effect, as manifested in bending, was found to be greater in the distal than in the proximal half of the branches of the umbel. In the proximal portion the vascular system is represented by numerous fibrovascular bundles of highly lignified, obliquely pitted elements, the bundles united into a cylindrical structure by masses of fibers with little dorsiventral differentiation. The distal part is dorsiventral in structure. On the upper adaxial side is an arch of 4 vascular bundles, the 2 uppermost obliquely pitted, the 2 lateral ones transversely. As the latter are capable of greater elongation, a mechanical differentiation is brought about between lateral and uppermost bundles, which causes the movements observed. The bundle on the lower side tends to oppose movement, but is not large enough to prevent it. By observing the action of longitudinal sectors of branches, the author obtained evidence that Kleins' view (that movement is due to difference in activity between abaxial and adaxial bundles) is erroneous. There is a marked degree of dorsiventral differentiation with respect to presence of sclerenchyma. Martel is wrong in assigning a major mechanical rôle to this, however, although it may be effective in the nyctitropic movements occurring before the ripening of the fruit.—*Charles Drechsler.*

1493. Maillefer, Arthur. **Sur le développement de la structure anatomique de la tige d'Impatiens Roylei Walpers. [Development of the anatomical structure of the stem of Impatiens Roylei Walpers.]** Bull. Soc. Vaudoise Sci. Nat. 52: 237–274. *Fig. 1–27.* 1919.—The young hypocotyl of this species shows 4 strands of protoxylem between each 2 of which may be distinguished 2 groups of phloem elements. The epidermis, a single layer of cells, overlies a layer of collenchyma cells which is separated from the endodermis by a thick cortex. Metaxylem cells begin to appear on the inner side of the protoxylem groups, which gradually disappear. The phloem now increases in mass and the cambium begins to appear and forms secondary wood near the lateral edges of the primary wood. A cavity results from the degeneration of the central portion of the pith. The secondary wood cells gradually assume isolated positions toward the center of the stem. The mature hypocotyl shows a layer several cells thick immediately inside the endodermis, the pseudopericycle. The cambium ceases to function after forming a considerable layer of fibers and vessels. Secondary parenchyma rays are present, distinct from medullary rays and having no relation to the pith.—The development of the stem is followed in the same way. In mid-summer a longitudinal section shows the tissues in the following order: Epidermis, dermal collenchyma, cortical cells, endodermis, phloem, cambium, pitted vessels, woody fibers, collenchymatous woody parenchyma, scalariform vessels, spiral vessels, and pith. Short sections are devoted to the structure of the phloem, the course of the vessels, the structure of adventitious roots, and the distribution of anthocyan in the epidermis.—*Charles Drechsler.*

1494. Molliard, M. **Sur des phénomènes tératologiques survenant dans l'appareil floral de la Carotte à la suite de traumatismes.** **[Teratological phenomena resulting from wounding the inflorescence of the carrot.]** Compt. Rend. Acad. Sci. Paris 172: 473–475. 1921.—The author reports a study of the wounding effects of grazing cattle upon the form and structure of the inflorescence of the carrot. Double flowers are reported, some that were almost without petals, and still others with neither stamens nor petals.—*C. H. Farr.*

1495. Purvis, O. N. **The effect of potassium salts on the anatomy of Dactylis glomerata.** Jour. Agric. Sci. 9: 338–365. *23 fig.* 1919.—Thickness of walls, diameter of lumina, and the ratio of lumen to wall were measured both in sclerenchyma and metaxylem elements of stems of *D. glomerata* grown on plots receiving different manurial treatments as regards potash. Where potash was supplied the sclerenchyma walls were thinner in early stages, but this effect was lost as the season progressed. Under the same conditions the lumina were larger than normal; but in the presence of ammonium salts this effect was reversed. The thickness of walls in the xylem was unaltered whether potassium was added or not, but the diameter of the lumen was reduced in the presence of potash. In the latter case the addition of ammonium salts with potash resulted in an increase in diameter.—The addition of potassium salts gave an increased ratio of lumen to wall, but the effect gradually disappeared. It is concluded that fertilization with potassic fertilizers reduces the strength of mechanical cells in the early stages of growth unless, indeed, the salts affect the composition of the wall. The rigidity of plants supplied with potassium salts is not the result of anatomical strengthening but must be attributed to other causes, such as the effect of the salts on the physiological condition of the plants.—*D. Reddick.*

1496. Rusby, H. H. **A strange fruit.** Torreya 21: 47–50. *1 fig.* 1921.—A description is given of the Mexican *Jarilla Sesseana* (Ramirez) Rusby. The fruit seems reversed in form, the thickened and elongated style simulating a peduncle, and the 5 fleshy curved appendages at the base resembling calyx lobes. The author regards this form as specifically distinct from *J. heterophylla.*—*J. C. Nelson.*

1497. Sahni, B. **Note on the presence of a 'tent-pole' in the seed of Cephalotaxus pedunculata.** Ann. Botany 35: 297–298. *2 fig.* 1921.—The seed of *Cephalotaxus pedunculata* shows a small apical prolongation of the female prothallus which props up the nucellar membrane somewhat after the fashion of a tent-pole. This is a strong Cordaitalean characteristic and the similarity is mentioned as additional evidence in support of the Cordaitalean affinity of the Taxales.—*W. P. Thompson.*

1498. Seeliger, Rudolf. **Die Abstoszung der primären Rinde und die Ausheilung des Wurzelbrandes bei der Zuckerrübe (Beta vulgaris L. var. rapa Dum.).** **[Sloughing of the primary cortex and healing of root canker in the sugar beet.]** Arbeit. Biol. Reichsanstalt Land- u. Forstw. 10: 141–148. *Pl. 1, 3 fig.* 1919.—In the absence of parasitic fungi no discoloration is produced in the cortex tissue at the time of the sloughing of the primary cortex; and the remains of such tissue on the hypocotyl are uncolored. When parasitic fungi are present the sloughing of the primary cortex is always accompanied by a greenish-brown, brown, or blackish-brown coloration of the infected tissue, but it is not possible to determine the degree of infection from the degree of color produced. Healing takes place unless the infection has passed beyond the tissue which is cast off. Rüggeberg's investigations of this same problem were carried on with plants grown in water cultures. Parasitic fungi present in the water cultures caused the discolorations reported by this author and his conclusions are not, therefore, descriptive of the normal conditions.—*Reginald H. Colley.*

1499. Seeliger, Rudolf. **Untersuchungen über das Dickenwachstum der Zuckerrübe (Beta vulgaris L. var. rapa Dum.).** **[Investigations on the growth in thickness of the sugar beet.]** Arbeit. Biol. Reichsanstalt Land- u. Forstw. 10: 149–194. *Pl. 2, 21 fig.* 1919.—The author investigated the morphology of the sugar beet from the seedling stage through 1 year's growth, and finds that the primary epidermis is soon divided off from the fundamental tissue of the root

and hypocotyl, that the annular and spiral vessels of the primary wood are cut off from functioning, and that the sieve tubes and companion cells are obliterated; but the pericycle, the metaxylem, and the parenchyma cells of the primary wood, and the parenchyma cells of the primary bast retain their functions. The normal circle of vascular bundles arises from a row of cells in the central cylinder. The primary medullary rays are formed by cells from the pericycle. The extra-fascicular vascular bundle circle arises from a meristem originating either in the pericycle or in the parenchyma of the primary bast. In the hypocotyl the fascicular meristem in the pith develops from the pericycle, whereas that outside the pith develops either from the pericycle or the parenchyma of the primary bast. In the root the fascicular meristem usually develops from the parenchyma of the primary bast. Storage tissue develops from parenchyma cells of the bast of the vascular rings and from medullary ray tissue. The outer cells of the pericycle develop into a phellogen several layers thick.—*Reginald H. Colley.*

1500. SOUÉGES, RENÉ. **Embryogénie des Scrofulariacées. Développement de l'embryon chez le Veronica arvensis. [Embryogeny of the Scrophulariaceae. The development of the embryo of Veronica arvensis.]** Compt. Rend. Acad. Sci. Paris **172**: 703–705. *Fig. 1–17.* 1921.—The stages of development of the embryo of *Veronica arvensis* are described. They are found to be quite similar to those of *Oenothera* and the Cruciferae.—*C. H. Farr.*

1501. VUILLEMIN, PAUL. **La zygomorphose endogène dans les fleurs normalement actinomorphes. [Endogenous zygomorphosis of flowers which are normally actinomorphic.]** Compt. Rend. Acad. Sci. Paris **172**: 428–431. 1921.—The types and examples are given of modifications of normally actinomorphic flowers into zygomorphic ones. Modifications of position of 2 types are described, namely, radial and circular displacement. Two types of modification of configuration are also defined, namely, homologous substitution and disproportion. Modification in number may be either discordant oscillation, abortion with addition of supplementary members, or the development of complementary members.—*C. H. Farr.*

1502. VUILLEMIN, PAUL. **La zygomorphose exogène dans les fleurs normalement actinomorphes. [Exogenous zygomorphosis of flowers which are normally actinomorphic.]** Compt. Rend. Acad. Sci. Paris **172**: 514–517. 1921.—Types and examples of exogenous zygomorphosis are given. The 3 main types distinguished are synanthic and parasynanthic zygomorphosis and zygomorphosis at a vegetative junction.—*C. H. Farr.*

MORPHOLOGY AND TAXONOMY OF ALGAE

E. N. TRANSEAU, *Editor*

(See in this issue Entries 1503, 1674)

MORPHOLOGY AND TAXONOMY OF BRYOPHYTES

ALEXANDER W. EVANS, *Editor*

1503. BOULGER, G. S. **The cryptogams of Andrews' Herbarium.** Jour. Botany **57**: 337–340. 1919.—This list is supplementary to a list of phanerogams. Notes are presented on 1 fern, 12 mosses, 6 hepatics, 21 algae, 4 lichens, and 7 fungi.—*K. M. Wiegand.*

1504. EVANS, ALEXANDER W. **Taxilejeunea pterogonia and certain allied species.** Bull. Torrey Bot. Club **48**: 107–136. *Pl. 2, 22 fig.* 1921.—The following species, which represent a clearly defined group, are treated: *Taxilejeunea pterogonia* (Lehm. & Lindenb.) Schiffn., widely distributed in tropical America; *T. jamaicensis* sp. nov., known only from Jamaica; *T. densiflora* sp. nov., known only from Jamaica and Colombia; and *T. debilis* (Lehm. & Lindenb.) Steph., widely distributed in tropical America.—*P. A. Munz.*

1505. HOLZINGER, J. M., AND T. C. FRYE. **Mosses of the Bureau of Soils Kelp Expedition to Alaska.** Publ. Puget Sound Biol. Sta. **3**: 23–64. *32 fig.* 1921.—A list is given of the mosses

collected by the Kelp Expedition in 1913, together with other unreported Alaskan species sent from time to time to the University of Washington. The species enumerated number 198 and the varieties 25. *Camptothecium paulianum* Grout from St. Paul Island and *Hypnum tananae* Grout from Tanana are described as new species, and *Aulacomnium androgynum pygmaeum* from Mitrofania Bay as a new variety. The following new combinations are likewise proposed: *Brachythecium pacificum* (Ren. & Card.) Grout, based on *B. reflexum pacificum* Ren. & Card.; and *Trachycystis pellucida* (Williams), based on *Bryobrittonia pellucida* Williams. The list includes 44 species and 11 varieties of mosses reported for the first time from Alaska. Two of the species, *Geheebia gigantea* (Funck) Boulay and *Zygodon reinwardti* (Hornsch.) Al. Braun, represent additions to the North American flora. Critical notes are interspersed throughout the article, and the recognition of the genera *Geheebia* and *Trachycystis* is suggested. The figures, arranged on 4 plates, were drawn by E. B. Chamberlain and represent *Bryobrittonia pellucida, Dicranella squarrosa* (Schrad.) Schimp., and *Trachycystis flagellaris* (Sull. & Lesq.) Lindb.—*T. C. Frye.*

1506. Luisier, A. **Fragments de bryologie ibérique. [Notes on Iberian bryology.]** Broteria Ser. Bot. 19: 5–11. 1921.—The 1st part of the article catalogues a collection of mosses made at Oña in the province of Burgos; *Campylium Sommerfeldtii* (Myr.) Bryhn is reported for the first time from Spain, and a supplementary list indicates the species previously known from the province. The 2nd portion of the article deals with the distribution on the Iberian peninsula of *Triquetrella arapilensis* Luis., *Brachymenium lusitanicum* (Luis.) Hagen, and *Claopodium Whippleanum* Sull.—*E. B. Chamberlain.*

1507. Luisier, A. **Les mousses de Madère. [Mosses of Madeira.]** Broteria Ser. Bot. 19: 36-48. 1921.—The present installment of this series [see Bot. Absts. 7, Entry 351] comprises the keys to the 1st part of the Pottiaceae.—*E. B. Chamberlain.*

1508. Meylan, Ch. **Note sur une nouvelle espèce de mousse. [On a new species of moss.]** Bull. Soc. Vaudoise Sci. Nat. 52: 383–384. 1919.—A new species, *Desmatodon Wilczekii*, collected at an altitude of 2600 m., is described. It represents a form intermediate between *Desmatodon* and *Pottia*, resembling the former genus in its gametophyte and the latter in its capsule. The spores measure 25–35 μ and are minutely papillate. Maturing in August, the operculum remains attached to the summit of the columella as in the genus *Hymenostylium*; no peristome is present.—*Charles Drechsler.*

MORPHOLOGY AND TAXONOMY OF FUNGI, LICHENS, BACTERIA, AND MYXOMYCETES

H. M. Fitzpatrick, *Editor*

(See also in this issue Entries 1308, 1309, 1318, 1323, and others in the section Pathology)

FUNGI

1509. Bijl, Paul A. van der. **Note on Lysurus Woodii (MacOwan) Lloyd.** Trans. Roy. Soc. South Africa 9: 191-193. *Pl. 11.* 1921.—The nomenclature of *Lysurus Woodii* and its relation to other species of the genus are discussed.—*E. M. Doidge.*

1510. Bijl, Paul A. van der. **South African Xylarias occurring around Durban, Natal.** Trans. Roy. Soc. South Africa 9: 181–183. *Pl. 7-8.* 1921.—Four species of *Xylaria* occur in the neighborhood of Durban, namely *Xylaria multiplex, X. apiculata, X. anisopleura,* and *X. polymorpha.* Three of these have not been previously recorded from South Africa.—*E. M. Doidge.*

1511. BIJL, PAUL A. VAN DER. **The genus Tulostoma in South Africa.** Trans. Roy. Soc. South Africa 9: 185–186. *Pl. 9.* 1921.—Two species of this genus are mentioned as occurring in South Africa, *Tulostoma cyclophorum* and *T. Lesliei*, the latter being described as a new species.—*E. M. Doidge.*

1512. BURLINGHAM, GERTRUDE S. **Some new species of Russula.** Mycologia 13: 129–134. *Pl. 7 (colored), fig. 1–6.* 1921.—Six new species are described and illustrated in colors.—*H. R. Rosen.*

1513. COLLINS, MARJORIE I. **Note on certain variations of the sporocyst in a species of Saprolegnia.** Proc. Linn. Soc. New South Wales 45: 277–284. *Fig. 1–11.* 1920.—Certain variations in sporocyst formation and discharge are recorded for an undetermined species of *Saprolegnia* growing under both natural and cultural conditions. Leptolegnia, Pythiopsis, and Achlya conditions occurred rarely, Dictyuchus and Aplanes conditions frequently. These variations occurred in both club-shaped and cylindric sporocysts but were not observed arising from resting sporocysts. The Dictyuchus condition differs from both of those described by LECHMERE and is held to be the true Dictyuchus condition. Composite sporocysts were observed; the most important combine the features of *Dictyuchus* and *Aplanes* (Dictyuaplanes). Evidence is given in favor of the suggestion that the Aplanes condition has arisen from the Dictyuchus by failure of the protoplast to escape from the germtube during its early growth. New sporocysts are frequently formed as lateral, basal branches of old sporocysts, owing to the blocking of the latter with empty cyst cases and germinating spores.—*Eloise Gerry.*

1514. COOL, CATH. **Het paddenstoeljaar 1920. [The toadstool year 1920.]** Levende Natuur 25: 292–298. *Fig. 5.* 1921.—The occurrence of higher fungi in various parts of the Netherlands during 1920 is reported.—*J. C. Th. Uphof.*

1515. CURTIS, K. M. **The life-history and cytology of Synchytrium endobioticum (Schilb.) Perc., the cause of wart disease in potato.** Phil. Trans. Roy. Soc. London B 210: 409–478. *Pl. 12–16.* 1921.—Two forms of reproductive bodies are formed in *Synchytrium endobioticum*, the resting sporangium and the sorus. Zoospores are liberated from the resting sporangium and, after a short period of activity, can infect young tissue of the potato plant. The zoospore penetrates the surface wall of an epidermal cell, a nuclear projection preceding the entrance of the body. It then passes to the lower end of the cell, enlarges and becomes differentiated into nucleus, cytoplasm, and outer membrane. This body is termed the prosorus. A process of repeated nucleolar discharge sets in; chromatin and linin are given off into the nuclear cavity; the chromatin is dissolved, the linin fills the cavity. The prophase of primary mitosis begins after the 3rd discharge. Five delicate strands distinct from the linin mass extend from the nucleolus to the opposite side of the cavity. The prosorus is invested by a thick outer and delicate inner membrane. The host cell enlarges and dies. The cytoplasm and nucleus of the prosorus pass through a pore in the membrane outward into the host cell. Repeated mitosis takes place in the nucleus during and following emergence. The 5 minute spherical chromosomes are believed to originate from a globule given off by the nucleolus. The spindle is intranuclear and the membrane persists until metaphase; centrosomes and asters are absent. After about 5 mitoses the prosorus segments into 4–9 sporangia, the walls of which arise by deposition of cleavage membranes independently of the nuclei. The sporangia remain inclosed within the common membrane. Nuclear divisions occur until 200–300 nuclei are formed in each sporangium. On absorption of water, areas are delineated by intersecting strands of protoplasm and vacuoles which become the zoospores. A blepharoplast lies on the periphery of each area and is connected on the one hand with nucleus and on the other with an adjacent zoospore by deeply staining strands; the latter become cilia. Repeated divisions of underlying host cells elevate the sorus, and division of adjacent epidermal cells produces a rosette surrounding the infected cell. The pressure due to the enlarging sporangia and the swelling of underlying cells ruptures the host cell and soral membrane and frees the sporangia. These in turn rupture at hyaline projections and liberate uniciliate motile cells which seem to be

facultative gametes. Their fusion in pairs was observed and the further development of both the unpaired zoospore and the zygote was followed in detail. Temperature is not the factor determining the sexual or asexual nature of the motile cells of the sorus, but it is believed that when water is withheld after the formation of the zoospores so that a maturation period intervenes prior to their discharge, the simultaneous discharge from several sporangia upon the renewal of a water supply causes the motile cells to act as gametes. It is believed that gametes fuse only with those of another sporangium. The soral zoospores are smaller than those produced by the resting sporangium but are otherwise similar; penetration by both kinds of zoospores and by the zygote is essentially the same. Either type of zoospore gives rise to a prosorus but the zygote produces a resting sporangium. The development of the latter resembles that of the sorus in the earlier stages; the substance of the nucleolus is repeatedly given off into the nuclear vacuole, the chromatin disappears, and a mass of linin remains. Subsequently chromatic granules appear in the cytoplasm; these become differentiated into chromatic and achromatic parts and are the primordia of zoospores. A reduction process is believed to supervene when all the chromatic material of the primordium except a single granule is given off into the cytoplasm; from this granule the nucleus of the zoospore is formed. A blepharoplast upon which the cilium is later inserted is connected with the nucleus by a strand. Mitotic divisions characteristic of the developing sorus are absent in the resting sporangium, and despite the sexual origin of these bodies clear evidence of reduction in their development is wanting. When more than 1 zygote penetrates a host cell the supernumerary cysts are distributed by mitotic divisions of the host cell. In this way resting sporangia come to lie several layers deep in the host tissue. The resting sporangium has a 3-layered membrane; the 2 inner ones are derived from the parasite, the outer from the disorganizing host cell. Rupture of the membrane results from swelling of the innermost layer in a conical internal projection. This species is precisely described by Schröter's diagnosis of the division *Mesochytrium* of the genus *Pycnochytrium*, but the author prefers to retain Fischer's generic name *Synchytrium*. Earlier references to the occurrence of giant zoospores with 2 cilia in this group are confirmed by the present study and interpreted as resulting from sexual fusions. The demonstration of the existence of sexuality in all Synchytriaceae which produce true resting sporangia is predicted.—*F. Weiss.*

1516. Doidge, Ethel M. **South African Ascomycetes in the National Herbarium.** Bothalia 1: 5–32. *Fig. 1–5.* 1921.—Fifty ascomycetes are described including the four new genera *MacOwaniella, Isipinga,* and *Palawaniella* belonging to the Polystomellaceae, and *Parastigmatea* of the family Stigmateaceae. Descriptions are given of the following new species: *Cycloschizon fimbriatum, Cocconia capensis, Polyrhizon Bewsii, Isipinga areolata, Elmerococcum Peglerae, Rosenscheldia horridula, Parastigmatea nervisita, Phragmodothella nervisequen, Catacauma Peglerae, Scolecodothis capensis, Phyllachora Lessertiae, Phyllachorella rikatliensis, Endodothella natalensis.*—*E. M. Doidge.*

1517. Doidge, Ethel M. **South African Perisporiaceae. VI. The haustoria of the genera Meliola and Irene.** Trans. Roy. Soc. South Africa 9: 117–127. *7 fig.* 1921.—The haustoria of several species are examined; the most common type is that which has a fine filament penetrating the cuticle and a small, globular, thin-walled, uninucleate vesicle in the epidermal cell. The nature of the penetrating filament appears to be specific in character and not correlated with the thickness of the cuticle traversed. Certain species penetrate into the first chlorophyll-containing cells of the mesophyll. The character of the penetrating filament is of diagnostic value and may, in some cases, be employed as a determining factor when there is any question of the identity of 2 species.—*E. M. Doidge.*

1518. Durand, Elias J. **New or noteworthy Geoglossaceae.** Mycologia 13: 184–187. 1921.—The author clarifies several species previously described and gives technical descriptions of *Trichoglossum confusum* n. sp. and *T. Wrightii* n. sp., the latter raised to specific rank from *T. hirsutum* forma *Wrightii* Durand.—*H. R. Rosen.*

1519. ELLIS, DAVID. **Advances in the study of yeasts.** [Rev. of: GUILLIERMOND, A. The yeasts. Translated and thoroughly revised in collaboration with the original author by F. W. TANNER. *xix + 424 p.* John Wiley and Sons: New York; Chapman and Hall: London, 1920.] (See Bot. Absts. 8, Entry 2057.) Nature 107: 387–388. 1921.

1520. FINK, BRUCE. **Notes on the powdery mildews of Ohio.** Ohio Jour. Sci. 21: 211–216. *Fig. 1–2.* 1921.—The article discusses 22 species of Erysipheae, giving localities, hosts, and species not previously reported from Ohio.—*H. D. Hooker, Jr.*

1521. FOËX, ETIENNE. **Liste des champignons récoltés dans le canton de Vaud et principalement à Saint-Cergue pendant l'été 1918.** [List of fungi collected in the canton of Vaud, especially near Saint-Cergue during the summer of 1918.] Bull. Soc. Vaudoise Sci. Nat. 52: 457–460. 1919.—The author mentions 59 different species of fungi and the hosts upon which they were collected.—*Charles Drechsler.*

1522. FOËX, ETIENNE. **Note sur un Cordyceps.** [On a species of Cordyceps.] Bull. Soc. Vaudoise Sci. Nat. 52: 461–464. *Pl. 1, fig. 1.* 1919.—The author describes and figures a specimen of *Cordyceps*, not altogether intact, collected in the Forest of the Jorat, that is probably to be referred to *Cordyceps capitata* (Holm.) Link, in spite of some variations from the description of this form. An interesting characteristic of the fungus is found in the filamentous ascospores becoming septate toward maturity, the segments later becoming disarticulated. The discharge of the ascus is accomplished by the ascus wall becoming gelatinous from the base upward, releasing the spore segments, often in a manner permitting the original linear arrangement of the latter to be perceived.—*Charles Drechsler.*

1523. GIBBS, L. S. **Notes on the phytogeography and flora of the mountain summit plateau of Tasmania.** Jour. Ecol. 8: 89–117. 1920.—A species of *Morchella*, collected in a Eucalyptus forest on Mt. Dromedary at an elevation of 3000 feet, is described under the name *M. tasmanica* J. Ramsbottom.—*Geo. D. Fuller.*

1524. HÖHNEL, FRANZ VON. **Fungi Imperfecti: Beiträge zur Kenntnis derselben.** [Contributions to our knowledge of the Fungi Imperfecti.] Hedwigia 60: 129–208. 1918; 60: 209. 1919.—*Phoma occulta* Desmazières is a typical *Sclerophomella*, closely related to *S. verbascicola* (Schw.) v. H., and is named *S. occulta* (Desm.) v. H. It is the conidial stage of a *Pleospora*, probably *P. vagans* Niessel or *P. infectoria* Fckl. *Sphaeria leptidea* Fr. is not, as stated by VLEUGEL, the conidial stage of *Lophodermium melaleucum* (Fr.) de Not., nor is it a *Sphaerella*, as assumed by FUCKEL. *Chaetopyrena* Sacc. 1883 is antedated by PASSERINI's genus of the same name published in 1881. On the type specimen of *C. hesperidum* Pass. occurs a *Ceuthospora*. GIBELLI and PENZIG have confounded these 2 different fungi and consequently the valid genus *Chaetopyrena* Pass. is not given in the Syll. Fung. *Ceuthospora phacidioides* f. *Citri* Penz. cannot be considered identical with *Chaetopyrena hesperidum* Pass. *Sclerochaeta* v. H. 1917 erected on *Phoma penicillatum* Fuckel is identical with *Chaetopyrena Passerini*. Therefore *C. hesperidum* Passerini should be called *C. penicillatum* (Fuck.) v. H.; it is the imperfect stage of a *Pyrenophora*. *Pyrenochaeta destructiva* MacAlp. may be a related *Chaetopyrena*.—*Phyllosticta Rosae* Roberge is discarded. *P. Rosae* Desm. is probably identical with *P. Rosarum* Pass., which is apparently based on the spermogonia of *Phragmidium subcorticium*. *Phyllosticta rosicola* Massalongo is shown to be a *Stictochorella* v. H. and probably belongs to *Sphaerella rhodophila* Passerini. *Phoma exigua* Desmazières is discarded. *Hendersonia* (*Piestospora*) *smilacina* Desmazières is referred to the genus *Cylindrophoma* as *C. smilacina* (Desm.) v. H. The genus *Plenozythia* is referred in von Höhnel's system of the Fungi Imperfecti to the Sphaerioideae-ostiolatae next to *Macrophoma*. All forms of brownish, or olive-brown color, even if soft-fleshy, are placed in the Sphaerioidaceae. Forms with hyaline pycnidia having a brown beak are referred to the Sphaerioidaceae. The same procedure is adopted for the Sphaeriaceae and Hypocreaceae. *Sphaeria Leguminis-Cytisi* Desmazières is referred to *Diplodina Leguminis-Cytisi* (Desm.) v. H. *Ascochyta Laburni* Sacc. and *Diplodina Laburni* Brun. are probably only forms of *D. Leguminis-Cytisi* (Desm.) v. H. As

far as known all species of *Diplodina* are conidial stages of *Didymella*, and as a member of this ascomycetous genus is sparsely present in the type-specimen the fungus is called *Didymella Leguminis-Cytisi* v. H. *Botryella nitidula* Sydow is a *Darluca* parasitic on a *Puccinia*. The *Puccinia* is a new species and is named *P. aculeatispora* v. H. *Sphaeria perforans* Roberge should be known as *Tiarospora perforans* (Roberge) v. H. This fungus is always accompanied by *Leptosphaeria sabuletorum* (Berk. et Br.) v. H. and is probably its conidial stage; the complete synonymy is given. *Haplosporella longipes* Ellis et Barth. is said to be a typical *Sphaeropsis* [*S. longipes* (E. et B.) v. H.]; it is perhaps only a form of *Sphaeropsis Mori* Berlese. *Pleosphaeropsis Dalbergiae* Diedicke, type of the genus, is shown to be merely a strongly erumpent *Sphaeropsis* which has a tendency toward multi-chambering and fusion of some pycnidia with each other; *Pleosphaeropsis* is dropped. *Coniothyrium olivaceum* Bon. var. *Pini-silvestris* Ferraris 1902 is treated as *Aposphaeriopsis Pini-silvestris* (Ferraris) v. H. *Coniothyrium Cedri* Rolland is possibly identical with it. The genus *Haplosporella* Speg. is a mixture of very different, unrelated forms. The type, *H. chlorostroma* Speg., is the same as *Camarosporium Robiniae* (West) Sacc., differing only in that for the most part the septation of the conidia has not occurred. *C. Robiniae* (West) Sacc., *C. fenestratum* (B. & C.) Sacc., and *C. Pseudoacaciae* Brun. are said to be identical. *Haplosporella Brunaudiana* Passerini is over-mature *Anthostomella Scopariae* H. Fabre. The old perithecia are used as hosts by an *Eriospora*, for which *E. biparasitica* v. H. is suggested. *Haplosporella caespitosa* (B. et Br.) Sacc. is perhaps a conidial form of *Cucurbitaria Hederae* Winter. *Haplosporella dothideoides* Sacc. is an over-mature member of the Phyllachoraceae, *Phaeochora Chamaeropsis* (Cooke) v. H. *Haplosporella minor* Ell. and Bartholomew is probably the conidial form of an unknown *Cucurbitula*, and *Sclerothyrium minor* (Ell. and B.) v. H. is suggested as its name. *Haplosporella missouriensis* Bubák is considered a *Dothiorella* with colored conidia. *Haplosporella Rhamni* Diedicke is called *Sclerothyrium Rhamni* (D.) v. H. *Coniothyrium insitivum* Sacc. is said to be a mixed species and in part is referred to a species of *Sclerothyrium*. *Haplosporella dendritica* Raciborski is probably a *Lasmenia* with a well-developed stromatic tissue. Certain species of *Haplosporella* are said to have demonstrable conidiophores; a new genus, **Microsporella**, is created for these. *M. pityophila* v. H. is the conidial stage of *Cucurbitaria pityophila* (K. and S.) de Not. *Stenocarpella Zeae* Sydow should be called either *Macrodiplodia macrospora* (Earle) v. H. or *Diplodia Zeae* (Schw.) Lév. var. *macrospora* (Earle) v. H. Ten different forms of *Septoria* described on the leaves of species of *Convolvulus* are discussed. They are said to represent but 2 different species, *Septoria Convolvuli* Desm. and *Hendersonia Calystegiae* (Westendorp) v. H.; a complete synonymy is given. *Taeniophora acerina* Karsten is transferred to the Sphaerioideae-astomae from the Excipulaceae. *Sphaeronaemella* Karsten was based on a Ceratostomella-like ascomycete. *Sphaeria vitrea* Corda is made the basis of a new genus of the Nectrioidaceae called **Hyalopycnis**; some related species of *Hyalopycnis* are perhaps conidial stages of *Hypomyces*. The new genus **Mycorhynchella** (Nectrioideae) is described. It differs from *Mycorhynchus* Sacc. in the micro-plectenchymatous structure of the pycnidia and in the conidia. A new genus, **Cyanophomella** v. H. (Nectrioideae-ostiolatae) is based on *Phoma acervalis* Sacc. *Botryogene* Sydow is identical with *Stagonostroma* Diedicke and *Botryogene visci* Sydow becomes *Stagonostroma visci* (Syd.) v. H. It is considered a pycnidial stage of a *Gibberella*. The nomenclatorial tangle existing in connection with the generic names *Chaetostroma* and *Amerosporium* is discussed and several new binomials are proposed. *Chaetodiscula hysteriformis* Bubák et Kabát is identical with *Myrothecium typhae* Fuckel, and *Chaetodiscula* Bub. et Kab. is identical with *Myxormia* Berk. et Br. The genera *Dinemasporium* Lév., *Pseudolachnea* Ranojevic, and *Dinemasporiopsis* Bub. et Kab. are identical. A new genus, **Bactrexcipula**, is created and referred to the Patelloidaceae-Excipulatae. The synonymy of *Psalidosperma mirabile* Sydow is given. It probably represents a new genus, **Eriosporella** v. H., of the Melanconiaceae. The description of *Hainesia* Ellis et Sacc. is amplified. *Dacryomyces Lythri* Desmazières is a *Hainesia* and is called *H. Lythri* (Desm.) v. H. *H. tremellina* Sacc. is a typical *Hainesia*. *H. Rubi* (Westendorp) Sacc. is not a *Hainesia* and is provisionally designated as *Leptosporium Rubi* (West.) v. H. *Hainesia Feurichii* Bubák probably belongs to *Pseudopeziza*. *Hainesia taphrinoides* D. Sacc. et Cavara is to be cancelled. *Phyllosticta destructiva* Desm. is said to

be a mixed species. The variety *Malvarum* upon the leaves of *Malva sylvestris* and *M. rotundifolia* is taken as the type; it is identical with *Ascochyta destructiva* (Desm.) v. H. upon *Malva* and should bear the latter name. The variety *b Lycii* should be known as *Ascochyta Lycii* (Desm.) v. H. A new genus, Stictopatella v. H., is based on *Phyllosticta destructiva* var. *c Evonymi* Desm. The type species is *Stictopatella Evonymi* (Desm.) v. H. The various species of *Phyllosticta* described upon *Hedera* are the same. *Apiosporium Fumago* Fuckel is called *Diplopeltis Fumago* (Fckl.) v. H. *Peltaster Hedyotidis* Sydow is said not to be related to *Eriothyrium dubiosum* Speg.; it is a conidial stage of one of the Coccodiniaceae. *E. fuegianum* Speg. belongs to the Pycnothyriaceae. An amended description is given for the genus *Asteromella* Pass. et Thüm. *Sacidium alpestre* Cesati is said to be hardly distinguishable from *Leptothyrium vulgare* (F.) but is called *L. alpestre* (Ces.) v. H. The conidial stage of *Euryachora betulina* (Fr.) Schröter is a member of a new genus of the Leptostomaceae, here named and described as Didymochora v. H. The genus *Dothiorella* Sacc. is a composite genus; many transfers to other genera are made and discussed. A description of the new genus Sclerothyrium v. H. is given followed by the complete synonymy. The type is *S. Tamarisci* (Mont.) v. H. *Sphaeropsis conglobata* Sacc. is said to be a typical *Hendersonula* Speg. and therefore must be called *H. conglobata* (Sacc.) v. H. It is probably the conidial stage of *Dothidea virgultorum* (Fr.) Wint. *Sphaeria oreades* Fries is merely a differently developed leaf-inhabiting form of *Dichomera Saubinetii* (Mont.) Cooke, as a variety of which it is named *oreades* (Fr.) v. H. The characterization of the genus *Dichomera* Cooke-Sacc. is amended and a new genus, Pseudodichomera v. H., is erected for *Dichomera varia* (Pers. ?) Diedicke, which is doubtless the conidial stage of *Cucurbitaria bicolor* Fuckel. *Dichomera Elaeagni* Karsten is given as *Pseudodichomera Elaeagni* (K.) v. H.; *Camarosporium Elaeagni* Potebnia is identical. *Dichomera Laburni* Cooke et Massee and the different species of *Camarosporium* which have been described on *Cytisus* are placed in *Pseudodichomera*. *Dichomera Tiliae* (Therry) Sacc., *D. sphaerosperma* (B. et C.) Sacc., and *D. stromatica* (Preuss.) Sacc. are genuine Dichomeras. *Dichomera mutabilis* Berk. et Broome is perhaps *Cucurbitaria Platani* Tavel. *Dichomera mutabilis* is a *Pseudodichomera*. On 1 specimen of *Dichomera mutabilis* occurred an undescribed *Botryodiplodia* which v. Höhnel names *B. corylicola*. The genus *Pseudostegia* Bubák is based upon *P. nubilosa* (Ell. et Ev.) Bubák, which is identical with *Cryptosporium atrum* Kunze. *Cryptosporium* Kunze and *Cryptosporium* Sacc. are, notwithstanding the fact that they both possess hyaline conidia, different from one another. *C. atrum* Kze. is closely related to *Pilidium* Kunze (not Sacc.) and *Harposporella* v. H. An amended description of *Cryptosporium* Kunze (not Sacc.) is given. The genus *Placosphaeria* Sacc. (not deNotaris) is discussed. It is understood to contain only the characteristic forms of the conidial stage of typical species of *Euryachora* Fuckel; 12 species are critically considered. *Coniothyrium concentricum* (Desm.) Sacc. is given as *Dothisphaeropsis concentrica* (D.) v. H. *Coniothyrium Agaves* (Mont.) Sacc. is very similarly constructed and a comparison of the 2 fungi must show whether it is a question of form of growth of the same fungus due to external stimuli or whether it is a different fungus. *Readeriella mirabilis* Sydow may be related to *Dothisphaeropsis*. *Phoma jasminicolum* Desmazières is shown to be a *Stictochorella* v. H., and is called *S. jasminicola* (Desm.) v. H. *Stictochorella Juniperi* v. H. n. sp. is probably a conidial stage of a species of *Carlia* (Phyllachoraceae). The genus *Leptostromella* Sacc. was erected by Saccardo and Roumeguère as a section of *Leptostroma*. It contained to a certain extent *Leptostroma* with elongate conidia. However, the 2 genera are entirely distinct. The type species, *Leptostromella septorioides* Sacc., is the conidial stage of a *Phyllachora*. *Linochora* v. H., erected for the conidial stages of *Phyllachora* with thread-shaped conidia, is different from *Leptostromella* Sacc. *Leptothyrium Cytisi* Fuckel is shown to be *Leptostromella Cytisi* (Fuck.) v. H.; *Leptostromella Atriplicis* Bubák et Krieger is similar. *Septoria caricinella* Sacc. et Roumeguère is a *Linochora* and is called *L. caricinella* (Sacc. et Roumg.) v. H., and is assumed to be the conidial stage of *Phyllachora caricis*. *Diplodina samaricola* Diedicke is said to have been incorrectly and incompletely described by Diedicke; it represents a separate form genus, which von Höhnel calls Septochora. *Diplodina samaricola* Diedicke should therefore be called *Septochora samaricola* (Died.) v. H. *Peltistromella brasiliensis* v. H. is said to be closely related to *Phragmopeltis* (P. H.) v. H. and *Peltistroma* (P. H.) v. H. but has 2-celled conidia. *Septoria*

macrospora Durieu et Montagne is shown to be closely related to *Kellermannia anomala* (Cooke) v. H., but is an independent genus which probably should be called *Piptarthron* Montagne. An amended description is given to the genus *Piptarthron* Montagne. *Ischnostroma Merrillii* Sydow is shown to be a conidial stage of a member of the Polystomellaceae, almost certainly an *Asterodothis* and not the conidial stage of a member of the Trichopeltaceae as previously stated. *Sirosphaera botryosa* Sydow is placed among the Pachystromaceae-Dothideales-Superficiales where it is supposed to be the conidial stage of a member of the Dothideaceae. On the type specimen of *Phoma Ilicis* Desmazières were found 2 fungi, *Phyllosticta ilicicola* C. et Ell., and *Phoma Ilicis*, which is a *Phomopsis* and is called *P. Ilicis* (D.) v. H. *Phoma lirella* Desmazières is a *Phomopsis*, *P. lirella* (D.) v. H., and on the same stem occurs the related *Diaporthe* (*Euporthe*) *Vincae* Cooke. *Phoma subnervisequum* Desmazières is a typical *Phomopsis* which must be called *P. subnervisequia* (Desm.) v. H. Since *Diaporthe Laschii* Nitschke occurs on *Evonymus*, *Phomopsis subnervisequia* probably belongs to it. *Phoma effusum* Roberge must be called *Phomopsis effusa* (Rob.) v. H., and it is probably the conidial stage of *Diaporthe* (*Tetrastaga*) *Therryana* P. et S. *Phoma Hellebori* Br. et Har. 1891 is said to be the same fungus. Only *Diaporthe Phoenicis* Pat. and *D. Chamaeropina* Gaja have been known upon palm leaves. A number of forms described on them as *Phoma* and *Phyllosticta* are certainly species of *Phomopsis*. Thus *Phoma cocoina* Cooke, *P. palmicola* Winter, *P. Phoenicis* Sacc., *P. Phoenicis* (Ces.) Sacc., and *P. coccophila* Speg. will probably all be reduced to 2 species. *Phomopsis syngenesia* (Brun.) v. H. is said to be the conidial stage of *Diaporthe syngenesia* (Fries). It is also stated that *Phoma syngenesia* P. Brunaud and *P. Frangulae* Oudemans are identical with *Phomopsis syngenesia* (Brun.) v. H. *Pyrenochaetinia obtegens* Sydow shows no bristles; it may for the present be placed in *Sclerophomina* v. H. *Sphaeria Miribelii* Fries should be known as *Sarcophoma Miribelii* (Fries) v. H.; the complete synonymy is given. This fungus is probably the conidial stage of *Naevia pallida* (Fuck.) Rehm. *Phoma nitidum* Roberge in herb. is transferred to the genus *Sclerophoma* as *S. nitida* (Rob.) v. H., although not a typical species. *Sphaeria aliena* Fries is *S. foveolaris* Fries 1823; a complete synonymy is given [see also Hedwigia 59: 270. 1917]. *Phoma punctiformis* Desmazières is referred to the genus *Sclerophoma* as *S. punctiformis* (Desm.) v. H. *Bakerophoma Sacchari* Diedicke, type of the genus, is shown to be worthless and the genus is cancelled.—*E. E. Honey.*

1525. Johnstone, Jas. **Fungoid infection of plaice.** Proc. and Trans. Liverpool Biol. Soc. 34: 120–121. *Fig. 1–2.* 1920.—Two plaice that had died in the spawning pond were found to have their liver, spleen, kidneys, and peritoneum containing small whitish nodules 1–2 mm. in diameter. The nodules were found to consist of a fungus body, composed of mycelium and sporangium-like bodies.—*Charles Drechsler.*

1526. Kauffman, C. H. **Isoachlya, a new genus of the Saprolegniaceae.** Amer. Jour. Bot. 8: 231–237. *2 pl.* 1921.—This new genus is established to include 3 species: *I. toruloides*, a new species here described under the joint authorship of Kauffman and Coker; *I. paradoxa* (Coker) comb. nov., and *I. monilifera* (de Bary) comb. nov. These are all characterized by the presence of the cymose *Achyla* mode of formation of secondary sporangia, coupled with diplanetic zoospores. *I. toruloides* was studied in detail and the morphological and physiological differences resulting from cultivation on various substrata are recorded.—*E. W. Sinnott.*

1527. Marchal, El., et Em. [Marchal]. **Contribution a l'étude des champignons fructicoles de Belgique. [Contribution to the study of the fruit-inhabiting fungi of Belgium.]** Bull. Soc. Roy. Bot. Belgique 54: 109–139. 1921.—The author identifies 67 species, of which 24 are species or varieties new to science. The investigations have been carried out for 6 years on fleshy fruits, especially on the stone-fruits. Frequent resort to pure cultures from mycelium was made. Besides forms already known, descriptions of the following new species are given: *Pleospora Lycopersici*, *Diaporthe perniciosa*, *Dothiorella vinosa*, *D. Mali* Karst. var. *globuligera*, *Fuckelia conspicua*, *F. Malorum* Oud. var. *macrosporium*, *F. rimosum*, *Cytosporella fructorum*, *Hendersonia vagans* Fuck. var. *fructicola*, *Oospora umbrina*, *Hyalopus pruinosus*,

Penicillium flavum, *P. olivaceum* Wehmer var. *discoideum*, *Gliocladium cinereum*, *Ramularia cerasorum*, *Torula lamelligera*, *Alternaria tenuis* Nees. var. *Mali*, *Tilachlidium nigrescens*, *T. Malorum*, *Isaria felina* Fr. var. *pirina*, *Graphium fructicolum*, *Tuberculari a piricola*, *Dendrodochium pulchrum*, *D. versicolor*.—*Henri Micheels.*

1528. Mayor, Eug. **Contribution à l'étude de la flore mycologique de la région de Chateau-d'OEx. [Contribution to the fungus flora of the Chateau-d'OEx region.]** Bull. Soc. Vaudoise Sci. Nat. 52: 395–418. 1919.—The author studied the fungus flora prevailing near Chateau d'OEx during the latter part of the summer and the fall of 1918. It was found to be richer than might have been expected from the meagre attention given to the region in floristic works on Switzerland. An annotated list of the parasitic forms, including, however, only the Peronosporaceae, Ustilaginaceae, Uredineae, Protomycetaceae, and the Erysiphaceae, is given, supplementing a similar one previously issued by the author on the fungus flora in the vicinity of Leysin, the 2 constituting an account of the parasitic fungi thriving in the Vaudoise Alps. In the present list, the Uredineae, represented by 142 species, and the Erysiphaceae, represented by 17 species, easily predominate, a fact partly attributable to the season of the year during which the collections were made. Of the Peronosporales 10 species are mentioned, and of the Ustilaginales 9 species. *Protomyces macrosporus* Unger, *P. Kreuthensis* Kühn, and *P. Leucanthemi* Magnus represent the Protomycetaceae.—*Charles Drechsler.*

1529. Murrill, William A. **Light-colored resupinate polypores - IV.** Mycologia 13: 171–178. 1921.—Descriptions are given of 16 species of yellow Porias, including the following new species: *P. ochracea*, *P. flavida*, *P. Calkinsii*, *P. Parksii*, *P. subradiculosa*, *P. flavilutea*, and *P. jalapensis*.—*H. R. Rosen.*

1530. Petch, T. **Hypocreaceae Zeylanicae.** Ann. Roy. Bot. Gard. Peradeniya 7: 85–138. 1920.—This paper consists of 2 parts, the 1st consisting largely of critical notes on Berkeley and Broome's types, the 2nd a systematic list. Eighty-one species in 2 genera are enumerated from Ceylon. The following are described as new: *Nectria discoidea*, *N. bomba*, *N. albofulta*, *N. sulcispora*, *Bresadolella nigra*, *Hypocrea gigantea*, *H. brunnea*, *H. extensa*, *H. chlorostroma*, *H. mellea*, *Hypomyces pallidus*, *Calonectria oodes*, *Gibberella rugosa*, and *Micronectria eugeniae*.—*E. D. Merrill.*

1531. Pethybridge, Geo. H. **Sexual organs of Phytophthora.** Nature 107: 204. 1921.—It was reported in Nature (93: 226. 1914) that in *P. erythroseptica* and *P. infestans* the oogonial incept penetrates the antheridium at an early stage, traverses it, emerges, and then swells to form the oogonium proper. This type of sexuality occurs also in other species. One on decaying apples has been found occasionally to show this phenomenon; also normal lateral fusion of sex organs on the same individual. Occasional occurrence of the oogonial penetration should be looked for in species of the *cactorum* or *omnivora* group. Exchange of material is desired by the author.—*O. A. Stevens.*

1532. Schneider, Albert. **"California bees."** Druggists Circ. 65: 10, 16–17. 1921.—An account is presented of a little known ferment, some of its uses, and commerical possibilities of growing it.—*C. M. Sterling.*

1533. Shear, C. L., and B. O. Dodge. **The life-history and identity of "Patellina fragariae," "Leptothyrium macrothecium," and "Peziza oenotherae."** Mycologia 13: 135–170. *Pl. 8–10, fig. 1–5.* 1921.—The authors present "an account of the life-history, morphology and taxonomy of a discomycete, *Pezizella lythri* (Desm.) Shear & Dodge, (comb. nov.) which is found on a great variety of plants, and has three stages in its life-cycle: sporodochia, pycnidia, and apothecia." The conidial stage belongs to the form genus *Hainesia*, the pycnidial is *Sclerotiopsis concava* (Desm.) Shear & Dodge comb. nov., and the ascigerous stage belongs to *Pezizella*. "Cross inoculation experiments show that the fungus is a weak parasite and passes readily under favorable conditions from one host to another." About 50 hosts are listed, including species of *Acer*, *Ampelopsis*, *Castanea*, *Cercis*, *Cornus*, *Duchesnia*, *Epilob-*

ium, Eucalyptus, Fragaria, Gaultheria, Gaura, Hicoria, Jambosa, Lythrum, Nyssa, Oenothera, Vaccinium, Pelargonium, Populus, Potentilla, Prunus, Quercus, Rhus, Ribes, Rosa, Rubus, Salix, Smilax, Ulmus, and *Vitis.—H. R. Rosen.*

1534. Stone, R. E. **Deadly poisonous mushrooms.** Canadian Field Nat. 34: 74–78. *Fig. 1–4.* 1920.—Five of the most poisonous mushrooms growing in the woods of Ontario are carefully described. The rules often applied to the gathering of mushrooms are included.—*W. H. Emig.*

1535. Zundel, George L. **Smuts and rusts of northern Utah and southern Idaho.** Mycologia 13: 179–183. 1921.—Nine smuts and 25 rusts are listed, together with hosts and localities in which collections were made.—*H. R. Rosen.*

LICHENS

1536. Anonymous. **A rare lichen.** Proc. Linn. Soc. New South Wales 45: 265. 1920.—A note is recorded on a lichen collected on Mount Koscinsko by Miss A. V. Duthie. One specimen collected in 1890 by Rev. F. R. M. Wilson is labelled *Dufourea madreporiformis* (Wulf.) Ach. It seems to have close affinities with *Dactylina artica* (Hook) Nyl. No apothecia are present.—*Eloise Gerry.*

1537. Sampaio, Goncalo. **Novas contribuicões para o estudo dos liquenes portuguesses. [New contributions to the study of Portuguese lichens.]** Broteria Ser. Bot. 19: 12–35. 1921.—This is a list of 74 species of lichens, mostly new to the flora of Portugal. Brief characterizations accompany each species mentioned and there is careful citation of localities. New combinations occur in *Bacidia, Buellia, Catillaria, Lecania, Lecanora, Lopadium,* and *Solenospora.—Lecanora gerezina* Samp. (nom. nov.) is proposed for *L. tristis* Samp. (non Merezk).—*Acarospora Zahlbrueckneri* Samp. and *Lecanora lisbonensis* Samp. are proposed as new.—*E. B. Chamberlain.*

1538. Wainio, E. A. **Lichens ab A. Yasuda in Japonica collecti. (Continuatio I.) [Lichens collected in Japan by A. Yasuda.]** Bot. Mag. Tôkyô 35: 45–62, 63–79. 1921.

BACTERIA

1539. Kufferath, H. **Bacterium Puttemansi Kufferath nov. sp. Microbe produisant des tacher sur la tomate (Lycopersicum esculentum) conservée. [Bacterium Puttemansi Kufferath n. sp., cause of spotting of canned tomatoes.]** Bul. Soc. Roy. Bot. Belgique 54: 190–194. 1921.—The spots appear in the form of small yellowish pustules resembling the pimples of human boils. The mycological features of the cultures and the inoculations are given. This is the first time that an organism causing lactic fermentation has been found causing lesions on preserved vegetables.—*Henri Micheels.*

1540. Schneider, Albert. **Bacteriology from the physico-astronomical viewpoint.** Pacific Pharm. 12: 107–114. 1918.

MYXOMYCETES

1541. Meylan, Ch. **Notes sur quelques espèces de Myxomycetes. [Notes on several species of Myxomycetes.]** Bull. Soc. Vaudoise Sci. Nat. 52: 447–450. 1919.—The author made a study of 3 forms derived from Persoon's original *Trichia botrytis*: (1) *T. botrytis* Pers. gen., (2) *T. lateritia* Lev., and (3) *T. subfusca*, the latter 2 being regarded by some authors as varieties of the first, and by others as independent species. He concludes that 3 good species are here represented, and defines the specific differences. *T. lateritia* alone always bears the sporangia aggregated in groups of 4–10, and apparently served as type for Persoon's *T. botrytis*. *T. subfusca* is distnguished from the other 2 by a marked difference in color of plasmodium.—A new species of *Hemitrichia* is proposed, *H. obrussea*; a new species of *Lamproderma, L.*

Gulielmae, dedicated to Miss Lister, is described, differing from *L. violaceum* in possessing smaller sporangia and larger spores. The genus *Diderma* is enriched by the addition of 2 new varieties, — *D. simplex* Schroet var. *echinulatum* var. nov. and *D. montanum* var. *roseum* var. nov.—*Charles Drechsler.*

PALEOBOTANY AND EVOLUTIONARY HISTORY

EDWARD W. BERRY, *Editor*

(See in this issue Entries 1374, 1497)

PATHOLOGY

G. H. COONS, *Editor*
C. W. BENNETT, *Assistant Editor*

(See also in this issue Entries 1143, 1147, 1266, 1419, 1421, 1435, 1471, 1498, 1517, 1617, 1641, 1642)

PLANT DISEASE SURVEY (REPORTS OF DISEASE OCCURRENCE AND SEVERITY)

1542. ANONYMOUS. **Mosaic or mottling disease of sugar-cane.** Agric. News [Barbados] 19: 345. 1920.—A communication to the local press from the Director of Agriculture, Barbados, is noted announcing the presence of the disease in that Colony. Canes found in St. Lucia and thought to be affected, proved on closer examination to be free from the disease though presenting a similar appearance.—*J. S. Dash.*

1543. HOWARD, W. L. **An old disease in a new place.** Proc. Amer. Soc. Hort. Sci. 17: 102–104. 1920 [1921].—Due to the fact that the regions of California in which stone fruits are grown are sections without summer rains, brown rot (*Sclerotinia cinerea*) was practically unknown. During the past 5 years considerable damage has been done but almost exclusively in the cool, moist region along the coast or in the vicinity of San Francisco Bay. The disease does most damage where frost injury is likely to occur. The atmosphere is quite humid in this region but why the fungus seems to have become adapted to spots where low temperature prevails around blooming time, rather than in warm places, is not clear. It was found that the disease could be controlled on apricots to within 4 or 5 per cent by a single application of either lime-sulphur (1 to 10), dry lime-sulphur (12 pounds to 50 gallons), or Bordeaux mixture (4–5–50), when the trees were sprayed after the fruit buds were noticeably swollen. Spraying after the trees are passing out of bloom does very little good, and spraying before the buds swell is equally unprofitable. Apparently the disease attacks the trees when they are in full bloom. Crude oil emulsion, which is commonly used in winter against brown apricot scale, gives promise of being an effective remedy where spraying is done after the buds begin to swell. A distillate emulsion, lime whitewash, and dry sulphur each have failed to control. Self-boiled lime-sulphur applied when the apricots were half grown had no effect upon the disease but completely checked the development of the fruit. Brown rot is not a serious problem with the ripe fruit, apparently because of the dryness of the air at the ripening period. The disease also attacks peach and plum but usually not seriously; in one locality it became serious on peaches at ripening time.—*H. W. Richey.*

1544. LEE, H. A., AND F. B. SERRANO. **Banana wilt in the Philippines.** Philippine Agric. Rev. 13: 128–129. 1920.—This disease, caused by *Fusarium* sp., is recorded from the Philippines, but the authors note that a number of local varieties of the banana are resistant or immune.—*E. D. Merrill.*

1545. LEE, H. A., AND H. S. YATES. **The distribution of pink disease.** Philippine Agric. Rev. 13: 115–116. 1920.—A short note is presented indicating that this disease of citrus hosts, caused by *Corticium salmonicolor*, was introduced into the Philippines earlier than the authors formerly supposed.—*E. D. Merrill.*

1546. Massey, L. M. **Experimental data on losses due to crowncanker of rose.** Phytopathology 11: 125–134. 1921.—Ophelia roses were grown under glass in infested and non-infested soil during a period of 3 years. A record was kept of the plants showing infection and of the number of blossoms produced. Plants becoming infected with the canker fungus (*Cylindrocladium scoparium*) were not killed outright, but were weakened and produced fewer blossoms than healthy plants. In this experiment the average decrease was about 10 blossoms per plant.—*B. B. Higgins.*

1547. Neger, F. W. **Die Krankheiten unserer Waldbäume und wichtigsten Gartengeholze. [The diseases of our forest trees and most important garden shrubs.]** *viii + 286 p., 234 fig.* Ferdinand Enke: Stuttgart, 1919.—After a short introduction the author presents his material in 2 main divisions. The 1st part treats diseases resulting from frost, heat, lack of or too much light, disturbance of the water balance, lack of or too much nutrient, poisonous gases, smoke, atmospheric disturbances such as wind, snow, lightning, etc., and mechanical injuries. The 2nd part opens with a general discussion of immunity, susceptibility, infection, host reaction, and control of parasitic diseases, and then takes up bacterial diseases, fungous diseases, and the injuries caused by lichens and parasitic phanerogams. The data on any particular disease are presented from the symptomatic standpoint, but short keys on the mycological differences of the parasitic species within a given genus are inserted whenever necessary. Footnote references to pertinent literature, in many cases accompanied by abstracts of the results obtained by the investigators cited, are used frequently. At the end of the book concise symptomatic descriptions of the diseases discussed in the text are given under the name of the host.—*Reginald H. Colley.*

1548. Wolf, F. A., and S. G. Lehman. **Notes on new or little known plant diseases in North Carolina in 1920.** Ann. Rept. North Carolina Agric. Exp. Sta. 43: 55–58. 1920 [1921].—The authors mention *Phoma corvina* on cotton following injury by lightning, and a root mold, *Penicillium spiculisporum*, described in Mycologia 12: 168–174. 1920; pod rot of cowpeas caused by *Choanephora cucurbitarum*; pod blight (*Diaporthe phaseolarum*) of lima beans; fig anthracnose (*Glomerella cingulata*); soft rot of peppers (*Pythium de Baryanum*); mosaic, anthracnose (*Glomerella cingulata*), and Phoma blight (*Phoma* sp.) of soy bean; buckeye rot (*Phytophthora terrestria*) of tomato; and downy mildew (*Peronospora viciae*) of vetch.—*F. A. Wolf.*

THE HOST (RESISTANCE, SUSCEPTIBILITY, MORBID ANATOMY AND PHYSIOLOGY

1549. Adams, J. F. **Observations on wheat scab in Pennsylvania and its pathological histology.** Phytopathology 11: 115–124. *Pl. 2–3, fig. 1.* 1921.—Under Pennsylvania conditions wheat (*Triticum sativum*) seedling infection by *Gibberella saubinetti* is comparatively unimportant. Head infection is much more prevalent, occurring in all the wheat-growing centers of the state. The majority of infections occur when the kernels are in the "milk" stage and injury is usually confined to 1 or 2 spikelets of a head. The kernels in such spikelets are conspicuously shriveled. The fungous mycelium apparently enters through the germinal end of the seed; and from this point, it spreads throughout the interior. The endosperm usually fails to develop. The embryo is entirely disorganized and replaced by a mass of intertwining mycelium. Apparently the mycelium does not spread through the rachis from one spikelet to another. In heads artificially inoculated during the flowering stage, the ovules failed to develop.—*B. B. Higgins.*

1550. Anderson, H. W. **Some factors influencing the practical control of blister canker in apple orchards.** Proc. Amer. Soc. Hort. Sci. 17: 111–116. 1920 [1921].—This is a report of investigations in Illinois orchards. The important factors in the etiology of the fungus are source and manner of infection and the life of the fungus in the host. The sources of infection are ascospores, conidia, and mycelium. Due to "(1) their immunity from injury by ordinary weather conditions, (2) their long vitality, (3) their ability to infect readily when

on the proper pabulum, (4) their great abundance, and (5) the provisions for their wide dissemination," the ascospores are the main source of infection. The conidia are produced in enormous numbers and may appear the first or any subsequent season. They are quickly killed by drying and probably cause but little infection, for repeated failures have resulted from attempts to cause infection under natural conditions. The mycelium is capable of causing infection but it is probable that such infections are rare. The manner of infection is influenced by disseminating agents such as water, wind, insects, pruning tools, etc.; by the opportunity for infection such as is occasioned by the presence of large wounds on older wood; and by the physical conditions such as age and vigor of tree and weather conditions, the canker being more prevalent on older trees and during dry seasons. The mycelium grows rapidly in the dry wood and may extend several feet from the apparent canker.—In Illinois the chief varieties injured are Ben Davis, Gano, Chenango, and Willow Twig. The author thinks that with the elimination of Ben Davis there would be but little trouble from the disease. Wild hosts, especially the mountain ash, should also be destroyed.—The author gives a plan for the practical control of blister canker which includes avoiding susceptible varieties, removing diseased young trees, and disinfecting and carefully pruning all diseased trees in order to destroy all ascospores.—*H. W. Richey.*

1551. CHEMIN, E. **Action d'un champignon parasite sur Dilsea edulis Stackhouse. [Effect of a fungus parasitic on Dilsea edulis.]** Compt. Rend. Acad. Sci. Paris 172: 614–617. 1921.—A description is given of the effect of parasitic fungi upon the plants of this red alga. The author discusses the parasitism and symbiosis of fungi living in association with algae.—*C. H. Farr.*

1552. MCLEAN, FORMAN T. **A study of the structure of the stomata of two species of Citrus in relation to citrus canker.** Bull. Torrey Bot. Club 48: 101–106. *1 fig.* 1921.—Stomata of Szinkum mandarin, which is resistant to Citrus canker (*Pseudomonas citri*), and of Florida seedling grapefruit, which is susceptible, are compared and those of the resistant form are found to have a broad ridge of entrance overarching the outer chamber. Such an arrangement practically excludes water from the stomata of the mandarin and accounts for resistance to canker bacteria.—*P. A. Munz.*

1553. MCLEAN, FORMAN T., AND H. ATHERTON LEE. **The resistance to citrus canker of Citrus nobilis and a suggestion as to the production of resistant varieties in other citrus species.** Phytopathology 11: 109–114a. *Fig. 1.* 1921.—The horticultural varieties of the Mandarin orange (*Citrus nobilis* var. *deliciosa*) have been mentioned by various writers as truly resistant to canker (*Pseudomonas citri*). The fact that a few scattered cankers frequently occur on trees of these varieties led to an investigation of the resistance of the latter. Inoculation with pure cultures of *Pseudomonas citri* were made upon wounded and unwounded leaves of three varieties of this group. The inoculation of wounded leaves gave a percentage of infection fully as high as with the more susceptible species of *Citrus*; while with the unwounded leaves only a few cankers developed, evidently at insect or other punctures. The results indicate that the resistance is due to the nature of the epidermis (see preceding entry). The utilization of graft hybrids, to transfer the Mandarin epidermis and resistance to other more susceptible varieties without changing the quality of the fruit, is suggested.—*B. B. Higgins.*

DESCRIPTIVE PLANT PATHOLOGY

1554. BIJL, PAUL A. VAN DER. **On a fungus, Ovulariopsis Papayae n. sp., which causes powdery mildew on the leaves of the pawpaw plant (Carica Papaya L.).** Trans. Roy. Soc. South Africa 9: 187–189. *Pl. 10, 1 fig.* 1921.—A description is given of the fungus which is thought to be the conidial stage of a *Phyllactinia.*—*E. M. Doidge.*

1555. CARPENTER, C. W. **Report of the Division of Plant Pathology.** Hawaii Agric. Exp. Sta. Rept. 1919: 49–54. *Pl. 7–8.* 1920.—Discussion of taro rot (probably *Pythium deBaryanum*), taro stem rot (*Sclerotium rolfsii*), and of the control of banana freckle disease

(*Phoma musae*) with Bordeaux mixture plus a resin-salsoda sticker is given. An annotated list of diseases affecting taro, peanuts, figs, bananas, and grape vines is included.—*J. M Westgate.*

1556. Elliott, John A. **A mosaic of sweet and red clovers.** Phytopathology 11: 146–148. *Fig. 1.* 1921.—A mosaic disease was found occurring naturally on plants of red clover (*Trifolium pratense*) and sweet clover (*Melilotus alba*). Cross inoculations proved that the disease could be easily transferred from one species to the other and from both to plants of *Vicia faba* and *Medicago arabica*. All attempts to inoculate plants of *Medicago sativa* and *Trifolium repens* failed.—*B. B. Higgins.*

1557. Enslow, Ella M. A., and Frederick V. Rand. **A lotus leafspot caused by Alternaria nelumbii sp. nov.** Phytopathology 11: 135–140. *Pl. 4, fig. 1.* 1921.—A leaf-spot of Egyptian lotus (*Nelumbium speciosum*) is ascribed to *Alternaria nelumbii* n. sp. The spots appear first as small, smooth, reddish-brown flecks which later enlarge to a diameter of 5–10 mm. and tend to develop concentric light and darker markings. The above named fungus was isolated from these spots and its pathogenicity proved.—*B. B. Higgins.*

1558. Eyer, J. R. **The influence of leaf hopper control on potato yields.** Jour. Econ. Entomol. 14: 69–71. 1921.—The author reports experimental work with Bordeaux mixtures, Bordeaux-nicotine, lime-nicotine, and nicotine-soap for the reduction of burning caused by leaf hopper (*Empoasca mali*) and to determine the effect of these control measures upon yield. Bordeaux (4–4–50) gave the best practical control. One set of plots was sprayed by hand and another by machine; the results were decidedly in favor of machine spraying, both from the standpoint of hopper-burn control and from the standpoint of yield.—*A. B. Massey.*

1559. Fabricius. [Rev. of: Gräbner, Paul. **Lehrbuch der nichtparasitären Pflanzenkrankheiten. (Textbook of non-parasitic plant diseases.)** *333 p., 244 fig.* Paul Parey: Berlin, 1920.] Forstwiss. Centralbl. 43: 184–185. 1921.—This book corresponds, in the field of non-parasitic diseases, to von Tubeuf's work on parasitic plant diseases. Forestry, while more or less helpless against parasitic diseases, can usually combat the others by means of silvicultural measures. Gräbner discusses the diseases under the following heads: Diseases due to (1) unfavorable soil conditions; (2) humidity and wind movement; (3) heat and light; (4) wounds; (5) noxious gases and liquids; (6) enzymes.—*W. N. Sparhawk.*

1560. Fenton, F. A. **Progress report on the season's work on the production of potato tipburn.** Jour. Econ. Entomol. 14: 71–83. 1921.—Studies and observations are reported on the nature of tipburn and habits of the insect which causes it. Tipburn was produced by the leaf hopper (*Empoasca mali*) to the same extent and equally rapidly under diverse environmental conditions of the host plants, such as soil type, soil moisture, humidity, and presence or absence of sunlight. The injury is local, not systemic, and is in itself the greatest factor in inducing burning. Severity of tipburn in fields is correlated with leaf-hopper population and not with sunlight, maximum temperature, or minimum humidity. Other potato insects are not concerned with tipburn. Mechanical injury such as needle punctures in veins gave no definite results. Complete severing of a midrib induced burning of leaflets in 19 days. Bordeaux mixture prevents tipburn by repelling ovipositing females.—*J. E. Kotila.*

1561. Müller, B. **Das Tannensterben im Frankenwalde. [Dying firs in the Frankenwald.]** Forstwiss. Centralbl. 43: 121–130. 1921.—A discussion of the cause of extensive dying out of firs in the Frankenwald, with a criticism of some of Scheidter's conclusions as to the causes, and remedies are given. Death appears to be due to an epidemic of the "Hallimasch" (*Agaricus melleus*), which is normally a saprophyte, but becomes parasitic under certain conditions, especially a prolonged drought. While Müller questions whether the methods of silvicultural management recommended by Scheidter will eliminate the disease, he suggests a number of points that need careful investigation.—*W. N. Sparhawk.*

1562. Taubenhaus, J. J., and Fredereck W. Malley. **Pink root disease of onions and its control in Texas.** Texas Agric. Exp. Sta. Bull. 273. *42 p., 3 fig.* 1921.—The disease is widespread, being found in California, Iowa, Wisconsin, New York, and Bermuda Islands, as well as in Texas. It is suggested that the disease was probably introduced from Bermuda in shipments of dry sets. The cause of the disease is shown to be *Fusarium malli*. All varieties of onions tested except the Extra Early Red showed a high degree of susceptibility. Narcissus, tulip, freesia, lilies, etc., are not subject to pink root.—It seems probable that other associated organisms increase the virulence of the pathogene. Methods of control, such as crop rotation, fertilizers, and soil sterilization, are discussed.—*L. Pace.*

1563. Vermoesen, M. **Note sur la maladie du "coup de soleil" des cacaoyers du Mayumbe. [Note on the "sun stroke" disease of cacao trees in Mayumbe.]** Bull. Agric. Congo Belge 11:2–21. *Fig. 1–41.* 1920.—The "sun stroke" disease attacks principally the trunks of cacao trees. A parasitic fungus, *Diplodia theobromae*, develops on the affected trunk, blocks the conducting vessels, and leads rapidly to the death of the tree. The *Diplodia* attacking cacao trees in Mayumbe, W. Africa, is the same species to which is attributed "dieback" of cacao trees, *Hevea* spp., and also the "brown rot" of cacao beans in various tropical countries. The *Diplodia* probably attacks trees of low vitality; it enters the trunk through wounds and acts so rapidly that trees which have formed fruits at the beginning of January are dead toward the end of February. Distribution is affected by wind, birds, insects, and rain. In dealing with this disease 2 factors must be considered; the primary or determining cause, which is still unknown, and the secondary cause, which is the *Diplodia*. Various theories have been advanced as to primary cause; planters attribute it to sun-scald, but this theory is not tenable. Certain other possibilities are discussed, particularly injury caused by borers and other insects, the damage done by termites, and the possible presence of another fungus hitherto undetected. Precautions recommended comprise general sanitary measures, the choice of suitable varieties, and attention to soil drainage.—*E. M. Doidge.*

1564. Vincens, F. **Parasitisme du Schizophyllum commune Fries sur la canne à sucre. [Parasitism of Schizophyllum commune on sugar cane.]** Bull. Agric. Inst. Sci. Saigon 3: 65–68. *Pl. 2.* 1921.—The author verifies the findings of others that this fungus, although normally a saprophyte, occurs as a parasite on sugar cane.—*E. D. Merrill.*

1565. Weir, James R. **Thelephora terrestris, T. fimbriata, and T. caryophyllea on forest tree seedlings.** Phytopathology 11: 141–144. *Pl. 5.* 1921.—*Thelephora terrestris* has been found enveloping forest tree seedlings in nursery plantings and in the forests of various localities. The fungus closely envelops and smothers the young plants; but the mycelium does not penetrate the living tissue.—*T. fimbriata* and *T. caryophyllea* were also found enveloping seedlings of various conifers in nurseries and in the forests. Neither of the latter species has previously been reported on coniferous seedlings.—*B. B. Higgins.*

1566. Wolf, Frederick A. **Report of the Division of Plant Pathology and Bacteriology.** Ann. Rept. North Carolina Agric. Exp. Sta. 43: 53–55. 1920 [1921].—The author presents a concise statement of investigations with tobacco wildfire, soybean leafspot, velvet bean leafspot, false anthracnose of vetch, crop injury by borax, flagellation of legume-nodule bacteria, and tests with varieties of wheat resistant to leaf rust.—*F. A. Wolf.*

ERADICATION AND CONTROL MEASURES

1567. Darnell-Smith, G. P. [Rev. of: Hurd, Annie May. **Injury to seed wheat resulting from drying after disinfection with formaldehyde.** Jour. Agric. Res. 20: 209–244. *6 pl.* 1920 (see Bot. Absts. 8, Entry 1375).] Agric. Gaz. New South Wales 32: 323–325. 1921.

1568. Farley, Arthur J. **Results of summer spraying and dusting peaches.** Proc. Amer. Pomol. Soc. 35: 175–181. 1917 [1919].—A comparative test on peaches of the value of self-boiled lime-sulphur and hydrated lime-sulphur and glue is recorded. Both materials

gave excellent results in preventing scab (*Cladosporium carpophilum*). In a comparison of dusting and spraying for the control of peach scab, the dust mixture was practically as efficient as self-boiled lime-sulphur in the control of scab.—*E. C. Auchter.*

1569. HUNGERFORD, CHAS. W. **A modification of the concentrated formaldehyde method of seed treatment.** Phytopathology 11: 149-150. 1921.—A formaldehyde solution (1 part formaldehyde to 10 parts of water) is sprayed upon the grain.—*B. B. Higgins.*

1570. REDDICK, DONALD. **Status of dusting in orchard protection.** Proc. Amer. Pomol. Soc. 35: 162–172. 1917 [1919].—An account of the early history of spraying and dusting is recorded. A brief history and description of dusting work done upon other crops and in other states are given. The author concludes that the future possibilities of dusting as a method of orchard protection cannot be predicted at this time.—*E. C. Auchter.*

1571. RIEHM, E. **Ein empfehlenswerter Reizapparat.** [An excellent steeping apparatus.] Illus. Landw. Zeitg. 41: 4. *1 fig.* 1921.—A description, with diagram, is given of a very elaborate apparatus for the treatment of seed wheat (1) with water for the separation of many diseased grains, and (2) with formaldehyde as a preventive of stinking smut (*Tilletia* spp.). Provision is also made for the subsequent drying of the seed.—*John W. Roberts.*

1572. THURSTON, H. W., JR. **A note on the corrosive sublimate treatment for the control of Rhizoctonia.** Phytopathology 11: 150–151. 1921.—Data are given on the growth from *Rhizoctonia* sclerotia taken from Irish potatoes treated with solutions of corrosive sublimate for various lengths of time.—*B. B. Higgins.*

MISCELLANEOUS (COGNATE RESEARCHES, TECHNIQUE, ETC.)

1573. ETTER, BESSIE E. **Field cultures of wood-rotting fungi on agars.** Phytopathology 11: 151–154. 1921.—The equipment needed, the media used and the method of packing it for shipment, and the results from a large number of inoculations are given in detail.—*B. B. Higgins.*

1574. GODFREY, G. H., AND R. B. HARVEY. **Motion pictures of zoospore production in Phytophthora.** Phytopathology 11: 145–146. *Pl. 6.* 1921.

1575. TILLEY, F. W. **Phenol coefficients.** Amer. Jour. Public Health 11: 513–519. 1921. —Phenol coefficients vary with the source of peptone used and with the hydrogen-ion concentration of the culture tested. They also vary with different organisms. The coefficients are determined in the absence of organic matter and so are of little value where the disinfectants are intended for use in its presence. Disinfectants should be tested under conditions simulating as closely as possible those under which they are to be used. It is more important to determine effective concentrations than to determine phenol coefficients.—*C. A. Ludwig.*

1576. VILLEDIEU, G., ET MME. [VILLEDIEU.] **De la non-toxicité du cuivre pour le mildiou.** [**Concerning the non-toxicity of copper for mildew.**] Compt. Rend. Acad. Sci. Paris 172: 335–336. 1921.—A very delicate test for copper is developed by using 100 cc. of a solution containing 2 drops of potassium ferrocyanide and 4 drops of acetic acid. By this test it is found that copper is not involved in the toxic effect of various solutions applied to fungi.—*C. H. Farr.*

PHARMACEUTICAL BOTANY AND PHARMACOGNOSY

HEBER W. YOUNGKEN, *Editor*
E. N. GATHERCOAL, *Assistant Editor*

(See also in this issue Entries 1107, 1113, 1182, 1196, 1197, 1198, 1202, 1205, 1207, 1210, 1211, 1256, 1682)

1577. ANONYMOUS. **Jalap production in Mexico.** Pharm. Era 53: 75–76. *1 fig.* 1920.— Temporary cessation in the production of Jalap is due to the earthquake of January 3, which

destroyed whole villages in the state of Vera Cruz where most of the drug is obtained. Jalap is collected, for the most part, from wild-growing plants, but has been cultivated successfully in India and Jamaica. Various other species of *Ipomoea* are used as substitutes for the true Jalap.—*C. M. Sterling.*

1578. Anonymous. **Malayan drug venders in the East Indies.** Pharm. Era 53: 263–264. *1 fig.* 1920.

1579. Anonymous. **New botanical drugs sought.** Pharm. Era 53: 321–324. *3 fig.* 1920.—A staff correspondent account of the H. K. Mulford expedition to South America, conducted by Dr. Rusby.—*C. M. Sterling.*

1580. Anonymous. **U. S. Pharmacopoeial Convention.** Druggists Circ. 64: 225–229. 1920.—An account is given of the proceedings of the convention in Washington, D. C., for the 10th decennial revision of the United States Pharmacopoeia, of Dr. Wiley's presidential address, and selection of the committee of revision.—*C. M. Sterling.*

1581. Ballard, C. W. **The identification of gums by the phenyl hydrazine reaction.** Amer. Druggist and Pharm. Rec. 68[8]: 28–30. *Fig. 1–14.* 1920.

1582. Berger, J. B. **"Starch count constants": Their determination and value.** Pacific Pharm. 12: 6–9. 1918.—Methods of procedure are given in making quantitative estimates of different starches, and the application of such estimates in food and drug analysis.—*C. M. Sterling.*

1583. Blokzeyl, K. R. F. **The cinchona industry in Java.** Pharm. Era 53: 69–73. *5 fig.* 1920.—An account is given of the introduction of *Cinchona* into southern Asiatic countries and its cultivation in Java. More than 20 species have been described.—Cultivation is most successful at an elevation of about 5000 feet and a temperature of 16–17°C. Seedlings, about 6 months old, grown from seeds of specially selected, superior trees are taken from the nursery beds and transplanted to larger beds. When the trees are 2–3 feet in height they are planted in the gardens. Propagation by grafting is also practiced.—For the most part bark is harvested by removing long, vertical strips and covering the denuded parts with moss, or by cutting down the trees to stumps of a certain height in order to let them renew their stems by fresh buddings. Bark for pharmaceutical purposes is removed in large sections and carefully prepared and rolled into "pipes," but bark used for the manufacture of quinine salts is scraped off after it has been beaten with wooden hammers. Drying is done in the sun as far as possible, but artificial drying at 100°C. is used to remove 10–15 per cent of moisture not removable at air temperature. Alkaloids are found in all parts of the plant, but principally in the parenchyma of the outer cortex. About 90 per cent of the world's production of Cinchona bark comes from Java. Until 1913, Cinchona bark was sold in Amsterdam at public auction, but in recent years England, the U. S. A., and Japan have been the largest buyers.—*C. M. Sterling.*

1584. Farwell, O. A. **The identity of commercial Blue Flag.** Amer. Druggist and Pharm. Rec. 67: 29. 1919.

1585. Fischer, Hanns. **Heilpflanzen und Siedlung. [Medicinal plants and colonization.]** Pharm. Zentralhalle 61: 279–281. 1920.—The cultivating and gathering of medicinal plants were neglected before the war. Germany was largely dependent on domestic drugs during the war and the author emphasizes the need for continuing domestic collecting and suggests that medicinal plants be cultivated wherever opportunity allows.—*H. Engelhardt.*

1586. Grant, E. H. **New tests for some purgative drugs.** Pharm. Era 53: 295–296. 1920.

1587. GRIEBEL, C., UND A. SCHÄFER. **Majoranpulververfälschung durch Bohnenkraut. [Imitation of marjoram powder by summer savory.]** Zeitschr. Untersuch. Nahrungs- u. Genussmittel 39: 299–300. 1920.—Morphological distinctions between the two are described with illustrations.—*H. G. Barbour.*

1588. GUNN, J. W. C. **The action of Urginea Burkei (Baker).** Trans. Roy. Soc. South Africa 9: 197–204. *5 fig.* 1921.—The results of a large number of experiments show that *Urginea Burkei* (Baker), the Transvaal Slang Kop, has the same actions as the digitalis bodies. It is suggested that it might possibly be used as a South African substitute for squills. —*E. M. Doidge.*

1589. GUPTA, S. N. **Coffee and its antiseptic value.** Pacific Pharm. 12: 57–59. 1918.

1590. HAMILTON, HERBERT C. **Interesting features of Digitalis.** Pharm. Era 53: 103–104, 134–136. 1920.

1591. HERZFELD, H. **Ilex paraguensis or La Yerba Mate.** Pharm. Era 53: 353–354. 1920. —The origin, history, preparation, physiological effects, chemical composition, and therapeutic indications of this beverage commonly used by all classes of South Americans are recounted.—*C. M. Sterling.*

1592. HUMPHREY, N. **The cultivation of medicinal plants.** Gard. Chron. 69: 175. 1921. —The author reviews a paper read before the North British Branch of the Pharmaceutical Society of Great Britain by R. GLADE GUYER. A medicinal plant farm was started at Narriston, Edinburgh, in 1915 by Duncan, Plockharr and Company, where aconite, belladonna, colchicum, foxglove, henbane, poppies, roses, stramonium, and valerian are grown commercially and experiments have been conducted with broom, calendula, dandelion, elder, and veratrum. Notes are given on a few of these plants.—*P. L. Ricker.*

1593. KEBLER, LYMAN F. **Suggested changes in the U. S. Pharmacopoeia.** Druggists Circ. 63: 483–485. 1919.

1594. KOCH, FELIX J. **Interesting differences between the familiar pie-plant of the markets and the medicinal herb from over-seas.** Amer. Druggist and Pharm. Rec. 68[1]: 42–46. 1920.

1595. KOCH, FELIX J. **Raising ginseng in Kentucky.** Amer. Druggist and Pharm. Rec. 67[11]: 36. 1919.

1596. KREMERS, EDWARD. **Problems in plant chemistry.** Pharm. Era 63: 325–326. 1920. —Problems presented to the author by the cultivation and working up of medicinal plants on a large scale are discussed.—*C. M. Sterling.*

1597. KRYZ, F. **Ein Beitrag zur Kenntnis der Farbstoffe der Hagebutten, der Hollunderbeeren und verwandter Beeren. [Coloring matter of hip, elder, and related berries.]** Zeitschr. Untersuch. Nahrungs- u. Genussmittel 38: 364–366. 1919.—The author describes the chemical characteristics of these colors.—*H. G. Barbour.*

1598. MCNAIR, JAMES B. **The transmission of Rhus poison from plant to person.** Amer. Jour. Bot. 8: 238–250. 1921.—The author reviews in some detail the previous literature on the subject. He then describes a series of experiments which indicate that the poison of *Rhus diversiloba* is not volatile, since (a) it is not distillable, (b) the smoke of the burning plant is not poisonous when filtered, (c) emanations from uninjured leaves are not poisonous, (d) dermatitis occurs only on those points on the skin where the sap has been applied, (e) the poison does not diffuse rapidly in the skin, and (f) the period of latency is too long. The author concludes that the poison is confined exclusively to the resinous sap. Malignancy of the leaf decreases on drying. Poisoning without contact with the plant may occur from the

smoke of the burning plant or by contact with substances that have the poisonous sap on them. —*E. W. Sinnott.*

1599. Maiden, J. H. **The larkspurs as poisonous plants.** Agric. Gaz. New South Wales 32: 326. 1921.—The article briefly reviews our knowledge of Delphiniums toxic to mammals and insects.—*L. R. Waldron.*

1600. Nestler, A. **Über den Nachweis von Rhinanthin im Mehl.** [Identification of rhinanthin in flour.] Zeitschr. Untersuch. Nahrungs- u. Genussmittel 39: 41–44. 1920.—Rhinanthin is a glucoside from seeds of *Alectorolophus hirsutus* and *Melampyrum arvense* with which meal may be adulterated, producing a blue or blue-green color in the presence of acid. The result is known as "blue bread." Hydrochloric acid (5–10 per cent) is used in the identification test described.—*H. G. Barbour.*

1601. Petrie, J. M. **Cyanogenesis in plants. Part IV. The hydrocyanic acid of Heterodendron—a fodder plant of New South Wales.** Proc. Linn. Soc. New South Wales 45: 447–459. 1920.—*Heterodendron oleaefolia* Def. (Sapindaceae), an endemic Australian evergreen tree or large shrub, has been much used for cattle feeding during drought, and many deaths have resulted. It is popularly known as rosebush, whitewood, rosewood, western rosewood, emubush, cabbagebush, boonery tree, dogwood, ironwood, bluebush, and bullockbush without reference to the application of these names elsewhere. It was found to contain a cyanogenetic glucoside yielding, when hydrolyzed, 0.328 per cent of hydrocyanic acid. It is therefore one of the most poisonous cyanogenetic plants known, yielding more than twice as much hydrocyanic acid as bitter almonds. One ounce of the air-dried leaves forms a lethal amount for 1 sheep. The leaves are invariably found to be deficient in enzyme, and require the addition of emulsin to bring about the complete decomposition of the glucoside. The foliage of the wild orange, *Capparis Mitchelli* Lindl. (Capparidaceae), was also found to be cyanogenetic; this is thought to be the 1st record in this family. Several of the Sapindaceae have been shown to be cyanogenetic, including *Ungnadia speciosa* Endl. of Mexico and Texas.—*Eloise Gerry.*

1602. Petrie, J. M. **The chemical examination of Macrozamia spiralis Miq.** Proc. Linn. Soc. New South Wales 45: 424–442. 1920.—This cycad grows abundantly along the east coast of New South Wales and has been regarded as a poisonous plant from the earliest days of the colony. A summary of its poisonous record is given including many instances where it was fatal to stock. The chemical composition of its leaves is characterized by a large amount of amorphous resins. The following constituents were identified: Formic, acetic, valeric, and lauric acids, also oleic, stearic, and higher fatty acids, and a very volatile essential oil; a phytosterol (melting point 132°C., optical rotation −34.5, melting point of acetate, 120°C.); a paraffin, with the properties of triacontane, $C_{30}H_{62}$; and an olefine having the properties of octodecylene. The nuts contained 39 per cent of starch and much mucilage. In feeding experiments, white rats were given, with their ordinary food, (1) the crushed fresh leaves, (2) the grated seeds, (3) the rich, fatty, resinous components extracted from the leaves by ether (which Dr. Lauterer stated contained the poisonous principle), and (4) the aqueous extract of the leaves and the seeds (by which the aborigines believed the poison was removed). The animals showed no signs of being affected after 3 weeks' feeding. The material was apparently not poisonous to white rats and no active poison principle was isolated or identified. With careless feeding, however, the animals are easily killed by impaction, which is due to the fibrous nature of the material.—*Eloise Gerry.*

1603. Phillips, E. P. **The genus Bersama.** Bothalia 1: 33–39. 1921.—The genus *Bersama* was monographed by E. G. Baker (Jour. Bot. 45: 12. 1907) and 2 species were described from South Africa. The interest in the various species was first aroused by Mr. C. C. Robertson, M. F., who sent samples of the bark to the Imperial Institute for examination, as it was reported that the natives use the bark medicinally. Under the name *B. tysoniana* 3 species have been included, *B. tysoniana*, *B. Swinnti*, and *B. Stayneri*. The bark of all is used medicinally by the natives.—*E. P. Phillips.*

1604. Rusby, H. H. **Suggestions for the revision of the pharmacopoeia.** Druggists Circ. 64: 123–126. 1920.

1605. Rusby, H. H. **Suggestions for the revision of the United States Pharmacopoeia.** Amer. Druggist and Pharm. Rec. 68[2]: 24–30. 1920.

1606. Rusby, H. H. **The H. K. Mulford Biological Expedition.** Druggists Circ. 64: 425–426. 1920.—A biological expedition, sponsored by the H. K. Mulford Co., in charge of Dr. Rusby will visit the upper Amazon valley, reaching southeastern Colombia and northwestern Brazil. The object is to investigate the medicinal plants of the region, but a study of the insects and reptiles abounding in the region will be undertaken by specialists and the fishes of the Amazon will receive especial attention. It is expected that the expedition will be isolated from civilization for about 6 months.—*C. M. Sterling.*

1607. Schneider, Albert. **Pharmaceutical research.** Druggists Circ. 65: 163–165. 1921.—The author discusses research and its necessity in pharmacy. A plan for the development of research in pharmacy and related subjects is presented.—*C. M. Sterling.*

1608. Seel, E. **Beiträge zur Kenntnis der Chemie und Pharmakologie der Aloe. [Chemistry and pharmacology of aloes.]** Arch. der Pharm. 257: 212–259. 1919.—The important constituents of aloes are given as: (1) Water-soluble crystalline aloin; (2) water-soluble amorphous aloetin; (3) resinous portion (insoluble in cold water); and (4) emodin (methyltrioxyanthraquinone or oxymethyldioxyanthraquinone). Detailed chemical analyses are given. 0.5–2.0 gr. of the puraloins (oxidation products of aloin) were found to give a mild purgative effect in children and dogs, but this was not dependable. The reliability of emodin as a cathartic in doses of 0.2–0.4 gr. at 3-hour intervals is confirmed. Oxyemodin is somewhat weaker, 0.5 gr. often being required. Like emodin it can be injected hypodermically. The only important effect of oxidizing aloe constituents with sodium peroxide appears to have been the purification of emodin itself.—*H. G. Barbour.*

1609. Stockberger, W. W. **Commercial drug growing in the United States in 1918.** Amer. Druggist and Pharm. Rec. 68[2]: 17–18. 1920.—Recent work to obtain marketable quantities of Belladonna, Cannabis, Digitalis, Calendula, sage, and henbane is reviewed.—*C. M. Sterling.*

1610. Stockberger, W. W. **Crude drug situation in the United States.** Western Druggist 43: 21–24. 1921.—The author reviews the crude drug supplies in the U. S. A. at the close of the World War. By way of improvement he suggests cultivation of plants in medicinal gardens, and the cooperation of state schools of pharmacy, botanists, high school teachers, and county agents in compiling information concerning the drug resources of the states.—*C. M. Sterling.*

1611. Swanson, C. O. **Hydrocyanic acid in Sudan grass and its effect on cattle.** Jour. Amer. Soc. Agron. 13: 33–36. 1921.—Sudan grass giving a strong test for HCN was not harmful to cattle. Liberation of HCN from Sudan grass is apparently associated with enzyme action. Slow drying causes HCN to disappear. The amount of HCN obtained was not diminished when Sudan grass was made into silage. Frosted Sudan grass, when tested immediately, gave very large amounts of HCN which rapidly disappeared when the plant wilted.—*F. M. Schertz.*

1612. Wallace, Emma Gary. **Some facts concerning camphor farming.** Pharm. Era 53: 261–262. *1 fig.* 1920.—An account of recent plans to furnish native-grown camphor for the American market is given.—*C. M. Sterling.*

1613. Watermeyer, F. W. **American liquid styrax.** Amer. Druggist and Pharm. Rec. 68[2]: 20. 1920.—American styrax, obtained from *Liquidambar styraciflua*, has been collected from large forests of trees located in Honduras. The species occurs in the southern states also, but in relatively small quantities. For many purposes the American styrax is superior to

the Asiatic and will probably be in demand when normal supplies of Asiatic styrax are again available.—*C. M. Sterling.*

1614. White, F. Ashford. **A glimpse of Grasse, the home of the French perfumery industry.** Amer. Druggist and Pharm. Rec. 68[6]: 18–20. *7 fig.* 1920.

PHYSIOLOGY

B. M. Duggar, *Editor*

Carroll W. Dodge, *Assistant Editor*

(See also in this issue Entries 1258, 1291, 1323, 1344, 1386, 1497, 1409, 1410, 1415, 1419, 1481, 1490, 1492, 1495, 1539, 1611, 1664)

DIFFUSION, PERMEABILITY, ADSORPTION

1615. Loeb, Jacques. **Ionic radius and ionic efficiency.** Jour. Gen. Physiol. 2: 673–687. 1920.—The writer has previously demonstrated that when solutions of electrolytes are separated from water by membranes, the ions with the same sign as that of the membrane increase while ions of opposite sign decrease diffusion of water through the membranes, and that the effects of these ions increase with an increase in valency. Aside from valency the so-called ionic radius, the distance between the central positive nucleus and the outermost ring or shell of electrons, also influences the rate of water diffusion. It is shown in this paper that the accelerating and depressing effects of anions increase directly with the order of magnitude of their radii in the order Cl $<$Br $<$I, while these effects of cations increase inversely as the radii in the order Rb $<$K $<$Na $<$Li. This is explained on the assumption that the actionof ions is electrostatic. The effect of the extra positive charge on the nucleus of a cation, therefore, will be greater the smaller the radius, while the effect of the excess electron of the anion will be greater the greater its distance from its own positive nucleus. It is suggested that a similar explanation might be adjusted to apply to polyatomic ions.—*Otis F. Curtis.*

1616. Loeb, Jacques. **The reversal of the sign of the charge of collodion membranes by trivalent cations.** Jour. Gen. Physiol. 2: 659–671. 1920.—The writer gives evidence to show that a collodion membrane treated with protein becomes positively charged when in contact with salts of trivalent cations. This reversal of charge is similar to that induced by acid (see Bot. Absts. 8, Entry 607). The reversal of the charge induced by trivalent cations, however, occurs on the alkaline side of the isoelectric point of the protein. Collodion membranes not treated with protein can not be induced to assume a positive charge by treatment with either trivalent cations or acid.—*Otis. F. Curtis.*

WATER RELATIONS

1617. Hottes, C. F. **A constant humidity case.** [Abstract.] Phytopath. 11: 51. 1921

MINERAL NUTRIENTS

1618. Anonymous. **Disintegration of roofing tile.** Sci. Amer. Monthly 3: 244. 1921.—The contributor quotes J. Scott (British Clay Worker 29: 138–140. 1920) to the effect that *Mucor racemosa* attacks roofing tile and thus obtains part of its food, causing the tile to disintegrate.—*Chas. H. Otis.*

1619. Dickson, James Geere. **The relation of certain nutritive elements to the composition of the oat plant.** Amer. Jour. Bot. 8: 256–274. *2 fig.* 1921.—The effect of limiting certain essential nutrient elements upon the chemical composition of the plant was studied. Pedigreed Swedish oats, *Avena sativa aristata*, were grown in sand cultures watered by nutrient solutions. The latter consisted of a modified Knop's solution (as a control) and 5 other modified solutions, in each of which 1 of the elements magnesium, calcium, potassium, phosphorus,

and nitrogen was reduced to $\frac{1}{10}$ of the quantity present in the normal solution. Plants were grown to maturity in each case. The calcium content of both grain and straw is reduced to about 10 per cent of that in the controls by reducing the calcium in the culture solution to $\frac{1}{10}$ the quantity in the complete solution. It is greatly reduced in both grain and straw by a similar deficiency in phosphorus or nitrogen. By reducing the phosphate in the culture solution to $\frac{1}{10}$ of the quantity in the complete solution used as control, the total phosphorus content of the grain is thereby reduced to 46 per cent and that of the straw to 10 per cent of the quantity found in the complete solutions. It is slightly reduced in both grain and straw by a similar deficiency in potassium, and is increased by a similar reduction of calcium or nitrogen. Variations in composition are more pronounced in straw, but in general are similar in both grain and straw. The phosphorus content of both grain and straw is modified by seasonal differences except in phosphorus-deficient solutions. The calcium content of the grain is modified by seasonal differences even in calcium-deficient solutions. The calcium content of the straw shows no consistent response to climate.—*E. W. Sinnott.*

1620. Espino, R. B. **A preliminary study of the mineral nutrition of young cotton plants.** Philippine Agric. Rev. 13: 335–343. 1920.

1621. Howe, H. E. **Some of the new applications of sulfur in agriculture.** Sci. Amer. 124: 392. 1921.—This is a condensation of an article by J. G. Lipman in a recent issue of the Chemical Age.—*Chas H. Otis.*

1622. Meier, Henry F. A., and Clifton E. Halstead. **Hydrogen-ion concentration relations in a three-salt solution.** Soil Sci. 11: 325–351. *Pl. 1, 9 fig.* 1921.—Fulcaster wheat was grown for a period of 35 days in water cultures containing potassium dihydrogen phosphate, calcium nitrate, and magnesium sulphate in varying proportions and having a total osmotic value of 1 atmosphere. The solutions were changed at 3-day intervals and the hydrogen-ion concentration determined at each change. No one combination of the 3 salts gave constantly a maximum yield of tops, roots, or total dry weight in the 3 sets grown at different periods. The cultures giving maximum dry weights exhibited minimum water requirements. The hydrogen-ion concentration of acid solutions in which the wheat was grown tended to approach neutrality. There was no apparent correlation between the yield of the plant and the hydrogen-ion concentration, or change in hydrogen-ion concentration. Those degrees of acidity which are just harmful to *Actinomyces* and *Azotobacter* have no visible effect on wheat.—*W. J. Robbins.*

1623. Trelease, S. F., and P. Paulino. **The effect on the growth of rice of the addition of ammonium and nitrate salts to soil cultures.** Philippine Agric. Rev. 13: 293–313. 1920.—The highest yields were secured when nitrogen was supplied as ammonium sulphate, the next higher in order being with nitrate—calcium nitrate and sodium nitrate.—*E. D. Merrill.*

PHOTOSYNTHESIS

1624. Yap, G. G. **A study of the photosynthesis of sugar cane.** Philippine Agric. 8: 269–276. 1920.—The general conclusions are as follows: The rate of photosynthesis decreased from 10 in the morning to 4 in the afternoon, the leaves being most active from 8 to 10 in the morning; young leaves are more active than old ones; the rate of respiration was apparently less than $\frac{1}{2}$ that of photosynthesis; high light intensity probably has an indirect relation to the rate of photosynthesis, tending to decrease photosynthetic activity.—*E. D. Merrill.*

METABOLISM (GENERAL)

1625. Delauney, P. **Nouvelles recherches concernant l'extraction des glucosides chez quelques orchidées indigènes: identification de ces gluosides avec la loroglossine.** [The extraction of glucosides from certain indigenous orchids and the identification of these glucosides with loroglossin.] Compt. Rend. Acad. Sci. Paris 172: 471–473. 1921.—The glucoside, loro-

glossin, is now found in 3 other orchids besides in the 2 previously reported [see also Bot. Absts. 8, Entry 582].—*C. H. Farr.*

1626. FULMER, ELLIS I., VICTOR E. NELSON, AND F. F. SHERWOOD. **The nutritional requirements of yeast. I. The role of vitamines in the growth of yeast.** Jour. Amer. Chem. Soc. 43: 186–191. 1921.—This paper presents data showing that water soluble B is not a necessary constituent of a medium for the growth of yeast.—*J. M. Brannon.*

1627. KOHLER, DENISE. **Variation des acides organiques au cours de la pigmentation anthocyanique. [Variation in the organic acids during the formation of anthocyan pigments.]** Compt. Rend. Acad. Sci. Paris 172: 709–711. 1921.—This is a study of anthocyan formation in the corolla of *Cobaea scandens*, the leaves of *Ampelopsis tricuspidata*, etc. An increase in organic acids was found in all cases in which the part of the plant experimented on was left attached to the plant; but no such increase occurred if the part was detached. In buckwheat leaves more acids are formed in darkness than in light.—*C. H. Farr.*

1628. LOEB, JACQUES. **La chimie des proteins et des colloides. [The chemistry of proteins and colloids.]** Rev. Gén. Sci. Pures et Appl. 32: 197–202. 1921.—This is a translation by G. Loewyand and W. Westresat of an article appearing in Science 52: 449–456. 1920.—*H. W. Anderson.*

1629. POSTERNAK, S. **Sur la constitution chimique et la synthèse du principe phosphoorganique de réserve des plantes vertes. [Chemical composition and syntheis of the phosphoorganic reserve substance in green plants.]** Compt. Rend. Soc. Phys. et Hist. Nat. Genève 37: 70–74. 1920.—The compound often designated phytic acid has never been found outside of green plants, where it occurs in seeds, tubers, rhizomes, and bulbs. It is found in the aleurone layer as a double salt of calcium and magnesium; also in the oily seeds of *Picea excelsa*, *Cannabis sativa*, and *Cucurbita pepo*. The investigation of the compound is made possible by the discovery of the crystallizable double salt $C_6H_{12}O_{27}P_6Ca_4Na_4$. The free acid is found to have the composition $C_6H_{24}O_{27}P_6$, which upon hydrolysis splits up thus: $C_6H_{24}O_{27}P_6 + 3H_2O = C_6H_{12}O_6 + 6H_3PO_4$, the reaction pointing toward the substance being inositehexaphosphoric ether of the formula $C_6H_{18}O_{24}P_6$. The substance, however, differs from the latter in having the equivalent of 3 additional molecules of water of constitution, which cannot be driven off without decomposing the material. The synthesis of inositehexaphosphoric ether shows, however, that it is indeed identical with the substance in question, and possesses the peculiarity of retaining 3 molecules H_2O so firmly as to resist dehydration without the attendant decomposition.—*Charles Drechsler.*

METABOLISM (ENZYMES, FERMENTATION)

1630. BATTELLI, F., ET L. STERN. **Oxydations et réductions fermentatives. [Oxydations and reductions by enzymes.]** Comp. Rend. Soc. Phys. et Hist. Nat. Genève 37: 65–68. 1920.—The author investigated the plausibility of WIELAND's views concerning the action of oxydases in biological oxidations, according to which these behave like platinum black, activating the hydrogen of reducing substances, and transferring it to substances combining with the latter. This theory rests on the hypothesis that oxidations and reductions are effected by the same enzymes. The author also studied the action of oxydases known to be present in the tissue of higher animals on compounds oxidized by them, in the presence of thionine. The oxydases of citric acid, succinic acid, phenylenediamine, uric acid, and alcohol were thus investigated. The results were held to confirm Wieland's hypothesis of the identity of oxydases and reductases; but they indicated, too, that his hypothesis concerning the mechanism of oxidations was wrong, this being explained better by a modification of Traube's theory modernized by the introduction of a knowledge of ionization.—*Charles Drechsler.*

1631. EPSTEIN, ALEXANDRE. **L'activité d'un ferment en fonction de la tension superficielle du milieu. [The activity of an enzyme in relation to surface tension of medium.]** Compt.

Rend. Soc. Phys. et Hist. Nat. Genève 37: 74–79. 1920.—Investigating the relation of the surface tension of a medium containing an enzyme to its activity, the author studied the activity of tyrosinase in the presence of increasing concentrations of monovalent alcohols. It was found that whatever alcohol was used, solutions of equal surface tensions produced comparable results, the maximum stimulation occurring at surface tension 70, and the post-optimum decline becoming more gradual with increase in the length of the carbon chain. Comparing the effect of alcohol with that of ether, chloroform, and acetone, the author concludes that the hydroxyl group has a weak inhibitory effect on tyrosinase. The activity of tyrosinase in the presence of alcohol is then the resultant of the stimulating effect induced by lowering the surface tension, of the depressing effect of the hydroxyl group, and of the retarding influence arising from the displacement of the enzyme by the alcohol at the surface of the two phases.—*Charles Drechsler.*

1632. Greig-Smith, R. **Ropiness in wattle bark infusions.** Proc. Linn. Soc. New South Wales 45: 52–89. *Pl. 9.* 1920.—Ropiness is often encountered in tanning liquors and there may be many causative organisms. This study was made on wattle bark infusions only, but the results are considered applicable to tanning liquors. Two closely allied bacteria, designated A and B, were isolated. They caused mucinous fermentation of bark infusions and of synthetic media containing sugar. The chemistry of the reactions and products is discussed. Information obtained from tanners on the occurrence of ropiness in other than wattle bark liquors is appended.—*Eloise Gerry.*

1633. Hérissey, H. **Sur l'hydrolyse du méthyl-d-mannoside α par les ferments solubles. [The hydrolysis of methyl-d-mannoside α by soluble ferments.]** Compt. Rend. Acad. Sci. Paris 172: 766–768. 1921.—Germinating seeds of lucerne are shown to contain d-mannosidase.—*C. H. Farr.*

1634. Mueller, Edward. **The chemistry of enzyme actions.** [Rev. of: Falk, K. George. **The chemistry of enzyme action.** *136 p.* Chemical Catalogue Company: New York, 1921.] Amer. Jour. Public Health 11: 546. 1921.

1635. Northrop, John H. **The influence of the substrate concentration on the rate of hydrolysis of proteins by pepsin.** Jour. Gen. Physiol. 2: 595–611. 1920.—It is pointed out that the apparent exceptions to the law of mass action found in enzyme reactions may be found in catalytic reactions in strictly homogeneous solutions.—These deviations in the rate of reaction from the law of mass action may be explained by the hypothesis that the active mass of the reacting substances is not directly proportional to the total concentration of substance taken.—In support of this suggestion it is shown that for any given concentration of pepsin the relative rate of digestion of concentrated and of dilute protein solutions is always the same. If the rate of digestion depended on the saturation of the surface of the enzyme by substrate the relative rate of digestion of concentrated protein solutions should increase more rapidly with the concentration of enzyme than that of dilute solutions. This was found not to be true, even when the enzyme could not be considered saturated in the dilute protein solutions.—The rate of digestion and the conductivity of egg albumin solutions of different concentration were found to be approximately proportional at the same P_H. This agrees with the hypothesis first expressed by Pauli that the ionized protein is largely or entirely the form which is attacked by the enzyme.—The rate of digestion is diminished by a very large increase in the viscosity of the protein solution. This effect is probably a mechanical one due to the retardation of the diffusion of the enzyme.—*Author's summary.*

1636. Schmitz, Henry. **Enzyme action in Echinodontium tinctorium Ellis and Everhart.** Jour. Gen. Physiol. 2: 613–616. 1920.—Mats of the tissue of *Echinodontium tinctorium*, a destructive wood-destroying fungus, which had grown for 3 months in pure culture on sliced carrots, were dried and powdered. Tests showed the presence of the following enzymes: Esterase, maltase, lactase, sucrase, raffinase, diastase, inulase, cellulase, hemicellulase,

urease, rennet, and catalase. Tests for the presence of amidase, tannase, proteases, also esterases acting on olive oil emulsion, and triacetin showed negative results.—*Otis F. Curtis.*

1637. Weiss, Freeman, and R. B. Harvey. **Catalase, hydrogen-ion concentration and growth in the potato wart disease.** [Abstract.] Phytopath. 11: 57–58. 1921.

METABOLISM (RESPIRATION)

1638. Anonymous. **Gaseous exchanges between plant roots and the air.** Sci. Amer. Monthly 3: 217. 1921.—This is a brief report of the results of the experiments of M. Raoul Cerighelli (see Bot. Absts. 8, Entry 652).—*Chas. H. Otis.*

1639. Gustafson, F. G. **Comparative studies on respiration. II. The effect of hydrogen ion concentration on the respiration of Penicillium chrysogenum.** Jour. Gen. Physiol. 2: 617–626. 1920.—For the most part measurements were taken of the time necessary to produce a given amount of CO_2, though in a few cases oxygen absorption was measured. Considering respiration in a neutral solution as normal, changes in concentration between PH 4–8 had practically no effect on the normal rate. Decreasing the PH value to 2.65 caused a gradual rise followed by a gradual return to normal, while at PH 1.10–1.95 the preliminary rise of about 20 per cent was followed by a fall to below normal within 60 minutes. Increasing the PH value to 8.80 resulted in a decrease in respiration to 60 per cent of the normal. The decrease in respiration due to a PH value of 1.95 or less was not reversible, while a similar decrease in rate which occurred at 8.80 was reversible.—*Otis F. Curtis.*

1640. Nicolas, M. G. **Contribution a l'étude des relations qui existent, dans les feuilles, entre la respiration et la présence de l'anthocyane. [Relations between respiration and the presence of anthocyan in leaves.]** Rev. Gén. Bot. 31: 161–178. 1919.—The author cites some literature, the evidence from which indicates that there is a relation, though not a direct one, between the presence of oxygen and the occurrence of red, blue, and similar pigments found in fruits and flowers.—Of 2 plants belonging to the same species, one of which is red and the other green, the former possesses fewer chloroplasts, manufactures less carbohydrate, and so exhibits a less intense gaseous exchange. There is apparently a greater fixation of oxygen in the red leaves than in the green. Where acids accumulate, there is a decrease in respiratory intensity. The acids are the result of the incomplete oxidation of sugar, and the red color depends on the formation of these acids. This accounts for the apparent necessity of oxygen in the production of the red color.—*J. M. Brannon.*

ORGANISM AS A WHOLE

1641. Fulmer, Ellis I., Victor E. Nelson, and F. F. Sherwood. **The nutritional requirements of yeast. II. The effect of the composition of the medium on the growth of yeast.** Jour. Amer. Chem. Soc. 43: 191–199. 1921.—The following is the medium which the authors find best for the growth of yeast: 100 cc. of the medium contains 0.188 gr. of ammonium chloride, 0.100 gm. of dipotassium phosphate, 0.040 gr. of precipitated calcium carbonate, 0.60 gr. of dextrin, and 10 gr. of cane sugar. The authors think it possible that such a colloidal material as dextrin protects the yeast against poisonous substances.—*J. M. Brannon.*

1642. Hopkins, E. F. **Hydrogen-ion concentration of the soil and seedling infection by Gibberella saubinetii.** [Abstract.] Phytopath. 11: 36–37. 1921.

GROWTH, DEVELOPMENT, REPRODUCTION

1643. Hopkins, E. F. **Growth and germination of Gibberella saubinetii at varying hydrogen-ion concentrations.** [Abstract.] Phytopath. 11: 36. 1921.

1644. K[enoyer], L. A. [Rev. of: Garner, W. W., and H. A. Allard. **Effect of the relative length of day and night and other factors on growth and reproduction in plants.** Jour. Agric. Res. 18: 553–605. 1920 (see Bot. Absts. 5, Entry 22).] Jour. Indian Bot. 2: 92. 1921

1645. Mason, T. G. **A note on poling in some fibre agaves.** Agric. News [Barbados 20: 84. 1921.—"The longevity of the plant and the number of years throughout which the crop can be secured, is of course decided by the number of years the plant passes in the purely vegetative state before poling and dying." Premature poling might render the cultivation of fiber-agaves impossible since it would not allow the planter sufficient time to recover his expended capital. An experiment with agave planted from bulbils was started in Montserrat in September, 1902. Instead of a 4-year period, the leaves were ready for reaping in 2 years, and by 1907, 25 per cent of the plants had poled. Apparently the whole life cycle of the plants was accelerated; 4 good crops had, however, been produced before the plants were dug out. After a reference to the kind of soil and climatic conditions best suited to the cultivation of agaves, the author concludes by pointing out the necessity for experimentation to determine the factors influencing premature poling.—*J. S. Dash.*

1646. Schaffner, J. H. **Reversal of the sexual state in certain types of monoecious inflorescences.** Ohio Jour. Sci. 21: 185–200. *Pl. 1–2.* 1921.—A list is given of common plants in which a complete change from one sexual state to the other takes place in the inflorescence. A detailed study of 7 species shows the character of the morphological expressions on the transition zone between tissues in a male state and those in a female state. Maleness and femaleness in plants are shown to be quantitative, reversible states arising during vegetative growth from neutral states. It is thought that sex can be controlled and changed from one state to another.—*H. D. Hooker, Jr.*

MOVEMENTS OF GROWTH AND TURGOR CHANGES

1647. Coupin, Henri. **Sur une tige à géotropisme horizontal. [A stem which displays horizontal geotropism.]** Compt. Rend. Acad. Sci. Paris 172: 608–610. 1921.—If seedlings of certain lentils are grown in darkness, the stems assume a horizontal position; if placed upright, they curve over to the horizontal again. They thus display a plagiotropism. If illuminated equally on all sides, they show ordinary negative geotropism.—*C. H. Farr.*

TEMPERATURE RELATIONS

1648. Bertrand, Gabriel, et Arthur Compton. **Influence de la chaleur sur l'activité de la salicinase. [The influence of temperature on the activity of salicinase.]** Compt. Rend. Acad. Sci. Paris 172: 548–551. 1921.—It was found that for salicinase of almond the lethal and optimum temperatures are decreased as the duration of exposure to the temperature is increased. The maximum temperature at which activity takes place is the same as the temperature of instantaneous destruction of the enzyme.—*C. H. Farr.*

TOXIC AGENTS

1649. Nobécourt, Pierre. **Action de quelques alcaloïdes sur le Botrytis cinerea Pers. [The effect of certain alkaloids on Botrytis cinerea.]** Compt. Rend. Acad. Sci. Paris 172: 706–708. 1921.—The basis of immunity in plants is often attributed to the presence of alkaloids, or related products, in the tissues of the host. *Botrytis cinerea* was chosen for this study because it is parasitic on so many plants, including *Nicotiana, Cinchona,* and *Atropa belladona,* as well as other plants which are high in alkaloids. Such alkaloids as atropine, nicotine, aconitine, and quinine sulphate were used with this fungus and these showed no toxic effects at concentrations greater than those commonly occurring in the host plants.—*C. H. Farr.*

1650. Osterhout, W. J. V. **The mechanism of injury and recovery.** Jour. Gen. Physiol. 3: 15–20. 1920.—During the changes leading to injury or death the resistance of many tissues to the passage of an electric current is altered, and this change in conductivity, since it can

be accurately determined, has been used by the writer as a measure of injury or recovery. It is assumed that the conductivity of the tissue of *Laminaria Agardhii* as found in sea water is normal and that a change in conductivity may be used as a measure of injury or recovery. The writer then exposed such tissues to certain solutions affecting permeability (of the same conductivity as sea water) for short periods. Upon returning them to sea water there was complete recovery. When exposed for longer periods recovery was only partial, indicating permanent injury. The writer's conception is that recovery is not a reversal of the reactions which produce injury, but that the reactions involved are practically irreversible and that injury and recovery differ only in the relative speed at which certain steps take place in a series of reactions which progress chiefly in one direction.—*Otis F. Curtis.*

1651. Osterhout, W. J. V. **A theory of injury and recovery. I. Experiments with pure salts.** Jour. Gen. Physiol. 3: 145–156. 1920.—Continuing work and using methods previously described (see preceding entry), the writer has experimented on the effects of solutions of NaCl and $CaCl_2$ on the conductivity of tissue of *Laminaria Agardhii*. Assuming that changes occur in series O→S→A→M→B and that the resistance of the tissue is proportional to the amount of M, equations are developed which make it possible to predict, after any length of exposure to solutions of NaCl or $CaCl_2$, the resistance of the tissue during the exposure as well as the resistance during recovery. The calculated data were found to agree very closely with the experimental data.—*Otis F. Curtis.*

1652. Osterhout, W. J. V. **A theory of injury and recovery. II. Experiments with mixtures.** Jour. Gen. Physiol. 3: 415–429. 1921.—Equations which serve to predict injury and recovery as measured by electrical conductivity of tissues when placed in pure salts (see preceding entry) will also serve to predict the injury and recovery of such tissues when exposed to mixtures of the two salts.—*Otis F. Curtis.*

1653. Osterhout, W. J. V. **A theory of injury and recovery. III. Repeated exposures to toxic solutions.** Jour. Gen. Physiol. 3: 611–622. 1921.—The equations previously used (see the preceding entries) may be used also to predict the behavior of tissues when transferred, with varying sequence, from sea water to solutions of the pure salts, or mixtures, and from thence to other solutions of pure salts or to sea water. It is suggested that explanations similar to the one advanced (see the 2 preceding entries) may be applied to other fundamental life processes.—*Otis F. Curtis.*

1654. Schoenholz, P., and K. F. Meyer. **The optimum hydrogen-ion concentration for the growth of B. typhosus, and B. paratyphosus A and B.** Jour. Infect. Diseases 28: 384–393. 1921.—*B. tyhposus* has a range of growth equivalent to P_H 5.0–8.6, with an optimum at P_H 6.8–7.0, in salt-free veal infusion broth. Large variations in the hydrogen-ion concentration about the optimum zone produce only slight effects on the growth of the organisms, while slight variations near the limiting concentrations produce a marked effect. *B. paratyphosus* A and B have a range of growth similar to that of *B. typhosus* but exhibit a greater tolerance for alkali.—*Selman A. Waksman.*

1655. Smith, Theobald, and Dorothea E. Smith. **Inhibitory action of paratyphoid bacilli on Bacillus coli. 1.** Jour. Gen. Physiol. 3: 21–33. 1920.—Gas and acid formation by *B. coli* grown on lactose bouillon is normal when following 4-day cultures of a number of more or less distinct strains of the "true hog-cholera bacilli" (including also *Bacillus icteroides* and *B. suipestifer*). Acid formation is normal but gas formation is inhibited when following 4-day cultures of all "true paratyphoid and *enteritidis* types." The inhibiting effects of the latter types disappear after incubation of about 3 weeks, while the former types produce inhibition after about the same time. The authors suggest that the inhibition is due to some metabolic product, possibly an enzyme. The presence of large numbers of the bacteria themselves did not inhibit gas formation, while the liquid remaining after centrifuging did produce inhibition. This inhibiting agent can be removed by filtering through a Berkefeld filter, by heating to about 100°C., or by clearing with kaolin.—*Otis F. Curtis.*

SOIL SCIENCE

J. J. Skinner, *Editor*

F. M. Schertz, *Assistant Editor*

(See also in this issue Entries 1101, 1109, 1124, 1147, 1153, 1257, 1398, 1404, 1416, 1417, 1619, 1621, 1642)

ACIDITY AND LIMING

1656. Connor, S. I. **Liming in its relation to injurious inorganic compounds in the soil.** Jour. Amer. Soc. Agron. 13: 113–124. 1921.—In 3 ways lime may act upon injurious inorganic compounds in the soil: (1) It neutralizes soil acidity; (2) it precipitates most injurious soluble salts which are found in acid soils; (3) it acts in an antagonistic manner toward excessive soluble salts which may not be precipitated. Aluminum, iron, manganese, boron, and zinc are harmful in a soluble form but are rendered less soluble and less injurious by lime. Aluminum toxicity is prevented by an abundance of phosphates. Active forms of silicates to a certain extent aid in precipitating aluminum salts.—*F. M. Schertz.*

1657. Fisher, E. A. **Studies on soil reaction I. A résumé.** Jour. Agric. Sci. 11: 19–44. *Fig. 1–6.* 1921.—The author discusses the importance of the soil reaction as a factor in soil fertility and reviews the theories of soil acidity. Methods of determining soil acidity are discussed and the problem of soil acidity is correlated with current physico-chemical conceptions of acidity in general. The ordinary titrimetric methods and the method of Hutchinson-MacLennan of measuring soil reaction and determining lime requirements are discussed.—*V. H. Young.*

1658. Fisher, E. A. **Studies on soil reaction II. The colorimetric determination of the hydrogen ion concentration in soils and aqueous soil extracts. (Preliminary communication.)** Jour. Agric. Sci. 11: 45–65. *Fig. 1–6.* 1921.—A discussion of the electrometric and colorimetric methods of H-ion determination is presented. A method for compensating for the turbidity of soil extracts is described. Soil samples were dried and extracts made from the dried soil. Centrifuged extracts, although somewhat turbid, were found to yield more constant results than clearer filtered extracts. Such solutions do not represent the actual H-ion concentration of the soil solution but rather of a solution obtained by shaking 1 part of soil with 2 parts of water for 1 hour. An attempt is made to correlate H-ion results with the lime requirements of the soil.—*V. H. Young.*

1659. Lyon, T. L. **The effect of liming on the composition of the drainage water of soils.** Jour. Amer. Soc. Agron. 13: 125–130. 1921.—The author reports on the influence of lime on the sulphur, calcium, potash, nitrogen, and phosphorus content of drainage waters.—*F. M. Schertz.*

1660. Robinson, R. H. **Acid soil studies I. A study of the basic exchange between soil separates and salt solutions.** Soil Sci. 11: 353–362. 1921.—Soil separates of 4 acid Oregon soils were treated with 0.1 N solutions of potassium chloride, potassium nitrate, sodium chloride, potassium acetate, and calcium acetate. By the Veitch and Jones method the lime requirement of these soils varied from 1500–20,800 pounds of calcium carbonate per 2,000,000 pounds of soil. The acidity of the different soil separates liberated by the action of a given salt solution was approximately the same. The so-called acidity liberated by potassium nitrate, potassium chloride, and sodium chloride was due mainly to iron and aluminum rendered soluble. The acidity produced by the acetates was due to acetic acid. The H-ion concentration of the different separates of the soil was constant.—*W. J. Robbins.*

1661. Robinson, R. H., and D. E. Bullis. **Acid soil studies: II. Changes in calcium compounds added to acid soils.** Soil Sci. 11: 263–267. 1921.—In an effort to determine why

some Oregon soils do not respond to lime treatment, pure calcium carbonate or calcium oxide was added to soils in pots and allowed to weather 1 year. A crop of barley was grown in the pots. At the end of a year samples were removed from the pots and the forms into which the calcium compounds had changed determined. The calcium was found chiefly combined with humus and easily decomposable silicates. Most of the calcium present in the acid soil which does not respond to lime was found combined as difficultly decomposable silicate.—*W. J. Robbins.*

GENERAL

1662. BECKLEY, V. A. **The formation of humus.** Jour. Agric. Sci. **11**: 69–77. 1921.

1663. COLBY, G. E. **A note on the use of anhydrite as a remedy for black alkali.** Monthly Bull. Dept. Agric. California **10**: 39–41. 1921.—Anhydrite was found to possess the same value as gypsum or land plaster as a chemical remedy for black alkali.—*E. L. Overholser.*

1664. FRED, E. B., AND AUDREY DAVENPORT. **The effect of organic nitrogenous compounds on the nitrate-forming organisms.** Soil. Sci. **11**: 389–407. *Pl. 1–2.* 1921.—*Nitrobacter* was grown upon washed nitrite-agar and on slants of Nährstoff-Heyden agar with and without nitrite present. Microscopical examination showed that this organism does not reproduce in liquid cultures of water, urine, peptone-beef infusion, or Nährstoff-Heyden infusion. The last was non-toxic but beef infusion or peptone-beef infusion contained a non-volatile toxic substance, soluble in ether or alcohol. *Nitrobacter* will live 2–6 weeks in a 1 per cent solution of gelatine, peptone, casein, yeast water, or Nährstoff-Heyden, or in milk or distilled water. Gelatine, peptone, casein, skimmed milk, beef infusion, and beef extract do not affect the oxidation of nitrite; asparagin, ammonium sulphate, and urea decrease it; Nährstoff-Heyden increases it above that in water controls. Sealed agar slants of *Nitrobacter* were kept more than 1 year without serious injury to the oxidative power.—*W. J. Robbins.*

1665. HARDY, F. **A preliminary investigation into the occurrence of different kinds of carbonates in certain soils.** Jour. Agric. Sci. 11: 1–18. 1921.—Samples of marine silt from the foreshore of the N. W. coastal belt of the Wash were found to contain dolomite. Studies were made to ascertain the effect of dolomite on such processes as nitrification in which the neutralizing effect of a quick-acting base is essential. Culture experiments tended to strengthen the view that dolomite has a definite effect on nitrification, and this view was further strengthened by an investigation of the nature of the carbonate in soils of which the geological and agricultural history is known. A technique for the estimation of the easily decomposed ("Calcitoid") and more stable ("Dolomitoid") carbonates was developed. Marine silts may be expected to contain calcitoid and dolomitoid carbonate; other soils do not generally contain the latter type of carbonate. Cultivation reduces the carbonate content of the soil, especially of calcitoid soils. Acidity may occur in soils containing both types of carbonates when the total carbonate content is greater than the amount considered necessary to prevent acidity. The reason for this is that the dolomite types of carbonate are not easily affected by the weak acids of the soil.—*V. H. Young.*

1666. HARDY, F. **Substitutes for pen manure.** Agric. News [Barabados] **20**: 21. 1921.—The author discusses various materials used in India to replace pen manure, such as oil cake, green manures, top soil from virgin forests or high jungles, earth from scrub jungles, earth from grass land, and tank silt. Not many of these substances are available to the average West Indian planter, to whom the author suggests the employment of scrub from waste places, rank herbage (including tall grasses), road sweepings, trimmings of trees, rotted lime or orange skins and seeds, waste green stuff from the banana, cacao and coconut crops, filter and scums from sugar factories, and cotton seed meal.—*J. S. Dash.*

1667. HIBBARD, P. L. **Sulfur for neutralizing alkali soils.** Soil Sci. **11**: 385–387. 1921.—The addition of sulphur to alkali soils was found to reduce the alkalinity and to improve the conditions for plant growth.—*W. J. Robbins.*

1668. JOHNSON, MAXWELL O., AND KIM A. CHING. **Report of the Chemical Division.** Hawaii Agric. Exp. Sta. Rept. 1919: 40–44. 1920.—A progress report on fertilizer experiments with bananas and pineapples is presented. In spraying pineapples on manganese soil an application of as much as 3,000 pounds of iron sulphate to the acre was unsuccessful in preventing chlorosis, while considerably less than 50 pounds per acre applied to the pineapple leaves promptly checked the chlorosis.—*J. M. Westgate.*

1669. MARCHAND, B. DE C. **The soils of Natal and the Transvaal. II. The soils of the Transvaal.** South African Jour. Indust. 4: 181–187. 1921.

1670. MASCHHAUPT, J. G. **Onderzoek naar de oplosbaarheid in met koolsuur verzadigd water van het in Thomasphosphaat en enkele andere phosphaten aanuezige phosphorzuur. [Investigation on the solubility of the acid phosphate contained in Thomas slag and other phosphates in carbon dioxide saturated water.]** Verslag. Landbouwk. Onderzoek. Rijkslandbouwproefsta. 23: 57–84. 1919.

1671. PATE, W. F. **II. Results of Phos-pho-germ, experiments conducted during 1919-1920.** Bull. North Carolina Dept. Agric. 1921: 14–16. May, 1921.—Tests with rye, corn, and cotton show that the use of Phos-pho-germ gives little or no increase in crop yields.—*F. A. Wolf.*

1672. SURR, G., and R. VAILE. **Some notes on the "dry bag" soils of the foothill districts, Tulare County, California.** Monthly Bull. Dept. Agric. California 10: 41–46. 1921.—It is believed that the shrinkage and the resulting cracks and dry-bag structure of certain adobe soils are mainly due to the presence of large amounts of plastic or colloidal clay-like material, with a corresponding lack of quartz and of the coarse resistant minerals in quantity to act as "fillers" and thus reduce the otherwise inevitable great shrinkage. Experiments indicate that it is highly desirable to permit the soil to crack somewhat after irrigation before practicing any tillage.—*E. L. Overholser.*

1673. WILLIAMS, C. C. **The soils of Natal and the Transvaal. I. The composition of Natal soils.** South African Jour. Indust. 4: 177–181. 1921.

TAXONOMY OF VASCULAR PLANTS

J. M. GREENMAN, *Editor*
E. B. PAYSON, *Assistant Editor*

(See in this issue Entries 1145, 1277, 1311, 1486, 1487, 1496, 1503, 1603)

MISCELLANEOUS, UNCLASSIFIED PUBLICATIONS

B. E. LIVINGSTON, *Editor*
S. F. TRELEASE, *Assistant Editor*

1674. ANONYMOUS. **Commission internationale pour l'exploration scientifique de la mer Mediterranée. Conference de Madrid, 17-20 Nov., 1919. [International commission for the scientific exploration of the Mediterranean Sea. Conference in Madrid, Nov. 17-20, 1919.]** Commission Internat. Exploration Sci. Mer Mediterranée Bull. 1. *24 p.* 1920.—A meeting was called of delegates from the countries bordering on the Mediterranean, with a view to organizing for a scientific study of that sea. The organization comprises a central bureau to coordinate the work of the stations in each country. The publication of the results will be largely in the hands of the central bureau, of which the Prince of Monaco is the president. Publication will be in English, Spanish, French, Greek, and Italian. Memoirs on oceanography are contemplated, and an atlas of the flora and fauna of the Mediterranean will be begun with the edible animals. The stations are to have uniform recording instruments,

and are to study the biology and geographical distribution, of the useful animals, the marine plants, and the plankton.—*T. C. Frye.*

1675. BARNARD, J. E. **Microscopy with ultra-violet light.** Sci. Amer. Monthly 3: 219-220. *5 fig.* 1921. [Reproduced from Nature 106: 378-381. 1920 (see Bot. Absts. 8, Entry 2255).]

1676. BEY, CHARLES AUDEBEAU. **Utilization des tiges de diverses plantes annuelles en vue de la production de l'énergie mécanique nécessaire aux travauax agricoles de la vallée du Niger. [The utilization of the stems of annual plants for the production of mechanical energy necessary to the agricultural activities in the valley of the Niger.]** Compt. Rend. Acad. Sci. Paris 172: 764-766. 1921.—The combustion of plant products as a source of energy is considered. It is found that waste parts of cotton and other crops can be used in this way.—*C. H. Farr.*

1677. BROWN, W. H. **Wild food plants of the Philippines.** Bur. Forest. Philippine Islands Bull. 21. *165 p., 81 pl.* 1920.—The species are arranged in botanical sequence under families and genera. It is the most comprehensive work of its kind so far issued in relation to the Philippine flora.—*E. D. Merrill.*

1678. CREVOST, C., ET C. LEMARIÉ. **Plantes et produits filmenteux et textiles de l'Indochine. [Plant fiber and textile products of Indochina.]** Bull. Econ. Indochine 23: 209-231, 406-433. 1920.—A continuation of the series (see Bot. Absts. 6, Entry 1539) covering the palms, bamboos, Cyperaceae, *Pandanus*, and miscellaneous vines of various families.—*E. D. Merrill.*

1679. JURITZ, CHAS. F. **Raw materials for industrial alcohol production.** South African Jour. Indust. 4: 167-173. 1921.

1680. NICHOLS, GEORGE E. [Rev. of: HEDRICK, U. P. **Sturtevant's notes on edible plants.** Rept. New York Agric. Exp. Sta. (Geneva) 1919[2]: 17-686. 1920 (see Bot. Absts. 8, Entry 862).] Torreya 21: 50-52. 1921.

1681. VON BLON, J. L. **California's seaweed industry.** Sci. Amer. 123: 445, 458. *2 fig.* 1920.—The article concerns itself with the manufacture and uses of agar-agar.—*Chas. H. Otis.*

1682. WEST, A. P., AND W. H. BROWN. **Philippine resins, gums, seed oils, and essential oils.** Bur. Forest. Philippine Islands Bull. 20. *230 p., 73 pl.* 1920.—The authors present a comprehensive treatise, from both a botanical and a chemical standpoint. Most of the species considered are illustrated.—*E. D. Merrill.*

1683. WILLIAMS, S. G. **Manila hemp.** Sci. Amer. Monthly 3: 255-257. *8 fig.* 1921.—A brief account is given of primitive methods of obtaining fiber from the banana plant abacá (*Musa textilis*), as practiced in the Philippines.—*Chas. H. Otis.*

INDEX TO AUTHORS' NAMES IN VOLUME IX

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BOTANICAL ABSTRACTS

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1922

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W. A ORTON, U. S. Bureau of Plant Industry, Washington, D. C.

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LIST OF ASSIGNED SERIAL PUBLICATIONS

The list here printed is an enumeration of the serial publications abstracted for all sections of Botanical Abstracts. (By a serial publication is here understood any publication which appears successively under the same title even though at long or irregular intervals.) The list is complete to January 1, 1922.

It is proposed to print the list once a year, and it is intended to serve the following specific purposes:

1. To inform the reader as to the precise extent to which Botanical Abstracts is covering serial literature which is likely to contain material falling within the scope of Botanical Abstracts. With it, the reader will be under no misapprehension concerning the completeness or incompleteness of the Journal.

2. To enable readers to bring to the attention of the Journal additional serials which should be abstracted. The serials being grouped by countries or geographical areas permits of easy detection of omissions.

Readers are urged to consult the list carefully and to call to the attention of the Bibliography Committee any serials omitted which should be abstracted. In this way readers may contribute to the improvement of the Journal. In communicating with the Bibliography Committee the exact titles of the omitted serials should be furnished.

In this period of readjustment many publications are either being discontinued or issued under new titles. Changes of this kind applying to serials in the list should also be communicated to the Bibliography Committee.

In the case of each serial, the portion of the title printed in **bold face** letters is the officially adopted abbreviation used in citing the publication.

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AFRICA

ALGERIA

Bulletin Agricole de l'Algérie et de la Tunisie
Bulletin de la Société d'Histoire Naturelle de l'Afrique du Nord
Revue Horticole de l'Algérie

BELGIAN CONGO

Annales du Musée du Congo Belge
Bulletin Agricole de Congo Belge
Congo

BRITISH EAST AFRICA PROTECTORATE

British East Africa Department of Agriculture Annual Report

EGYPT

Almanach de la Société Sultanienne
Annuaire de l'Université Egyptienne
Bulletin of the Alexandria [Egypt] Horticultural Society
Bulletin de l'Institut d'Egypte
Bulletin de l'Union des Agricultures d'Égypte
Cairo Scientific Journal
Department of Agriculture, Egypt, Horticultural Section Leaflet
Mémoires presentées à l'Institut d'Egypte

NYASALAND PROTECTORATE

Nyasaland Protectorate, Annual Report of the Department of Agriculture

RHODESIA

Rhodesia Agricultural Journal

TUNIS

Revue Tunisienne

UGANDA PROTECTORATE

Annual Report of the Department of Agriculture Uganda Protectorate

UNION OF SOUTH AFRICA

Annals of the Bolus Herbarium
Annals of the Natal Museum
Annual Progress Report, Forest Department, Union of South Africa
Annals of the South African Museum
Annals of the Transvaal Museum
Botanical Survey of South Africa Memoirs
Bothalia
Flowering Plants of South Africa
Journal of the Botanical Society of South Africa
Journal of the Department of Agriculture, Union of South Africa
Official Year Book of the Union of South Africa

Records of the Albany Museum [Grahamstown, South Africa]
Report of the South African Museum
South African Fruit Grower and Smallholder
South African Gardening and Country Life
South African Journal of Industries
South African Journal of Natural History
South African Journal of Science
South African Sugar Journal
Transactions of the Royal Society of South Africa
Union of South Africa, Department of Agriculture Science Bulletin

ZANZIBAR PROTECTORATE

Zanzibar Protectorate Annual Report of the Department of Agriculture

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ASIA

CHINA

Annual Report of the Botanical and Forestry Department of Hongkong
Hua-Shang-Sha-Chang-Lien-Ho-Hui-Ki-Kan [China Cotton Journal]
Journal of the North China Branch of the Royal Asiatic Society
Ko-Hsueh [Science—a Publication of the Chinese Science Society]

CYPRUS

Cyprus Agricultural Journal

FEDERATED MALAY STATES

Agricultural Bulletin of the Federated Malay States
Department of Agriculture, Federated Malay States Bulletin
Journal of the Federated Malay States Museum

INDIA AND CEYLON

Administrative Report, Afforestation Division United Provinces
Agricultural Journal of India
Agricultural Research Institute Pusa Bulletin
Annual Report of the Agricultural Station of East Bengal and Assam
Annual Report and Proceedings of the Science Convention of the Indian Association for the Cultivation of Science
Annual Report of the Board of Scientific Advice for India
Annals of the Royal Botanic Garden, Calcutta
Annals of the Royal Botanic Garden of Peradeniya
Bulletin of the Carmichael Medical College, Belgachia
Bulletin, Department of Land Records and Agriculture, United Provinces of Agra and Oudh
Bulletin of the Medras Fisheries Bureau
Bulletin of the Madras Museum
Ceylon Administrative Reports Part IV.—Education, Science, and Art, Marine Biology
Department of Agriculture, Bombay, Bulletin
Department of Agriculture, Bombay, Leaflet
Department of Agriculture, Ceylon, Bulletin
Forest Leaflets [India]
Forest Pamphlet [India]
Indian Agriculturist
Indian Forester
Indian Forest Memoirs
Indian Forest Records
Indigo Publications of the Agricultural Research Institute, Pusa.
Journal of the Asiatic Society of Bengal
Journal of the Bombay Natural History Society
Journal of the Department of Science Calcutta University
Journal of Indian Botany
Journal of the Madras Agricultural Students Union
Memoirs of the Asiatic Society of Bengal
Memoirs of the Department of Agriculture of India Bacteriological Series
Memoirs of the Department of Agriculture of India Botanical Series
Memoirs of the Department of Agriculture of India Chemical Series
Mysore Agricultural Calendar
Mysore Department of Agriculture Bulletin Chemical Series
Mysore Department of Agriculture Bulletin General Series
Mysore Department of Agriculture Bulletin Mycological Series
Paleontologia Indica
Poona Agricultural College Magazine
Proceedings of the Agri-Horticultural Society of Madras
Proceedings of the Board of Agriculture in India
Proceedings of the Indian Association for the Cultivation of Science
Proceedings of the Planters Association of Ceylon
Quarterly Journal of the Indian Tea Association, Scientific Department
Records of the Botanical Survey, India
Records of the Geological Survey, India
Report of the Colombo Museum
Report of the Department of Agriculture of Medras
Report of the India Agricultural Station, Burma
Report of the Karimganj Agricultural Experiment Station
Report on the Operations of the Department of Agriculture of Burma
Review of the Agricultural Operations in India
Scientific Reports of the Agricultural Research Institute of Pusa
Spolia Zeylanica
Transactions of the Bose Research Institute of Calcutta
Tropical Agriculturist

INDO-CHINA

Bulletin Agricole de l'Institute Scientifique de Saigon
Bulletin Économique de l'Indochine

JAPANESE EMPIRE

Annals of the Phytopathological Society of Japan
Berichte des Ohara Instituts fur Landwirtschaftliche Forschungen
Botanical Magazine of Tokyo
Icones of the Essential Forest Trees of Hokkaido
Journal of the College of Agriculture of Hokkaido Imperial University
Journal of the College of Agriculture, Imperial University of Tokyo
Journal of the College of Science, Imperial University of Tokyo
Memoirs of the College of Science, Kyoto Imperial University

STRAITS SETTLEMENTS

Gardens' Bulletin Straits Settlements
Journal of the Straits Branch of the Royal Asiatic Society

STRALIA, NEW ZEALAND AND TASMANIA

tural Gazette of New South Wales
. Progress Report, Queensland Forest Service
. Progress Report, Woods and Forests Department, ıth Australia
. Progress Report, Woods and Forests Department, stern Australia
ian Forestry Journal
ian Garden and Field
ian Museum Memoirs
ian Museum Records
ian Naturalist
ian Sugar Journal
l of the Department of Agriculture, South Australia
l of the Department of Agriculture of Victoria
l of the Natural History and Science Society of stern Australia
l and Proceedings of the Royal Society of New ıth Wales
rs of the Queensland Museum
ealand Journal of Agriculture
rn Territory [Australia] Bulletin
and Proceedings of the Royal Society of Tasmania
dings of the Linnean Society of New South Wales
dings of the Royal Society of Queensland
lings of the Royal Society of Victoria
of the Minister of Agriculture, South Australia
of the Director, New South Wales Botanical rdens
: and Industry
Annual Progress Report, Woods and Forest Department, Western Australia
ctions and Proceedings of the New Zealand stitute
ctions and Proceedings of the Royal Society of ıth Australia
n Australia Woods and Forest Department Bulletin

EAST INDIES

BRITISH EAST INDIES

k Museum Journal

DUTCH EAST INDIES

s du Jardin Botanique de Buitenzorg
voor de Rubbercultuur in Nederlandsch-Indië
voor de Suikerindustrië in Nederlandsch-Indië
n du Jardin Botanique Buitenzorg
Berichten uitgaande van de Selectie en Zaadtuin . [Nederlandsch-Indië]
eelingen, Afdeeling Zaadteelt [Nederlandsch-lië]
eelingen v/h Algemeen Proefstation voor den ldbouw [Nederlandsch-Indië]
eelingen v/h Besoekisch Proefstation
eelingen v/h Instituut voor Plantenziekten [Nederdsch-Indië]
eelingen v/h Kina Proefstation [Nederlandsch-lië]
eelingen v/h Landbouwvoorlichtingsdienst [Nederdsch-Indie]
eelingen v/h Algemeen Proefstation der Algemeene reenigen Rubber-planters Oostkust Sumatra g. Ser.)
Mededeelingen v/h Proefstation voor Boschwezen [Nederlandsch-Indië]
Mededeelingen v/h Proefstation Malang
Mededeelingen v/h Proefstation Midden Java
Mededeelingen v/h Proefstation voor Thee [Nederlandsch-Indië]
Mededeelingen v/h Proefstation voor Vorstenlandsche Tabak
Tectona
Teysmannia
Thee
Treubia
Tropische Natuur
Vlugschrift Deli Proefstation

PORTUGUESE EAST INDIES

Boletim de Agricultura [Nova Goa]

EUROPE

AUSTRIA

Annalen des Naturhistorischen Museums Wien
Centralblatt für das Gesamte Forstwesen [Wien]
Mitteilungen aus dem Forstlichen Versuchswesen Oesterreichs
Oesterreichische Botanische Zeitschrift
Oesterreichische Vierteljahresschrift für Forstwesen
Oesterreichische Zeitschrift für Kartoffelbau
Sitzungsberichte Akademie der Wissenschaften Wien (Math-Nat. Klasse)
Wiener Allgemeine Forst- und Jagdzeitung
Zeitschrift für das Landwirtschaftliche Versuchswesen in Deutsch Oesterreich
Zeitschrift der Wiener Gartenbaugesellschaft

BELGIUM

Annuaire de l'Académie Royale des Sciences, des Lettres et des Beaux-Arts de Belgique
Annales de Biologie Lacustre
Annales et Bulletin de la Société Royale des Sciences Médicales et Naturelles de Belgique
Annales de Gembloux
Annales de Médecine Vétérinaire
Annales de la Société Géologique de Belgique, Liége
Archives de l'Institut Botanique, Université de Liége
Bulletin de la Classe des Sciences de l'Académie Royale de Belgique
Bulletin des Naturalistes Belges
Bulletin de la Société Belge de Géologie, de Paléontologie et d'Hydrologie
Bulletin de la Société Centrale Forestière de Belgique
Bulletin de la Société Royale de Botanique de Belgique
Bulletin de la Station Agronomique de l'État à Gembloux
Cellule
Isis
Mémoires de l'Académie Royale de Belgique Classe des Sciences
Mémoires du Musée Royal d'Histoire Naturelle Belgique
Mémoires de la Société Belge de Géologie de Paléontologie et d'Hydrologie Bruxelles
Mémoires de la Société Géologique de Belgique, Liége
Mémoires de la Société Royale des Sciences Liége
Revue Horticole Belge
Revue Zoologique Africaine (Supplément Botanique)
Travaux de la Société Belge de Biologie

CZECHO SLOVAKIA

Abhandlungen Böhmischen Gesellschaft der Wissenschaften, Prague
Zeitschrift für Zuckerindustrie in Böhmen

DENMARK

Arbejder fra Botanisk Have [København]
Botanisk Tidsskrift
Comptes Rendus des Travaux du Laboratoire de Carlsberg
Dansk Botanisk Arkiv
Dansk Skovforenings Tidsskrift
Forstlige Försogsväsen i Danmark
Gartner-Tidende
Haven
K. Veterinaer og Landbohoejskole Aarsskrift
Meddedelser fra Foreningen til Svampekundskabens Fremme
Naturens Verden
Nordisk Jordbrugsforskning
Tidsskrift for Frøavl
Tidsskrift for Landokønomi
Tidsskrift for Planteavl
Tidsskrift for Skovvaesen
Ugeskrift for Landmaend
Vort Landbrug

FINLAND

Acta Societatis Scientiarum Fennicae
Ofversigt Finska Vetenskaps-Societetens Förhandlingar

FRANCE

Actes de la Société Linneènne de Bordeaux
Album Général des Cryptogames
Annales de le École Nationale d'Agriculture de Montpellier
Annales des Falsifications
Annales de l'Institut National Agronomique [France]
Annales de l'Institut Pasteur
Annales du Musée Colonial de Marseille
Annales de Paléontologie
Annales de la Science Agronomique Française et Étrangère
Annales des Science Naturelles—Botanique
Annales du Service des Épiphyties [France]
Annales de l'Université de Lyon
Année Biologique
Archives Internationales de Physiologie
Archives de Médecine Experimentale et d'Anatomie Pathologique
Bulletin de l'Académie Internationale de Géographie Botanique
Bulletin Agricole et Viticole de la Touraine
Bulletin de l'Association des Chimistes de Sucrerie et de Distillerie de France et des Colonies
Bulletin de la Commission Internationale pour l'Exploration Scientifique de la Mer Méditerranée
Bulletin de l'Institut Oceanographique de Monaco
Bulletin de l'Institut Pasteur
Bulletin Mensuel de l'Académie des Sciences, Lettres de Montpellier
Bulletin Mensuel d'Horticulture, de Viticulture et d'Études Agronomiques du Puy-de-Dome
Bulletin, Muséum d'Histoire Naturelle Paris
Bulletin de l'Office de Renseignements Agricoles, France
Bulletin des Sciences Pharmacologiques
Bulletin de la Société Botanique de France
Bulletin de la Société Dendrologique de France
Bulletin de la Société d'Études Scientifiques d'Angers
Bulletin de la Société de Pathologie Végétale de France
Bulletin de la Société Philomathique de Paris
Bulletin de la Société des Sciences Naturelles de l'Ouest de la France
Bulletin Trimestriel dé la Société Forestière de Franche-Comté et Belfort
Bulletin Trimestriel, Société Mycologique de France
Comptes Rendus des Séances de l'Académie d'Agriculture de France
Comptes Rendus de l'Académie des Sciences, Paris
Comptes Rendus des Séances de la Société de Biologie [Paris]
Horticulture Nouvelle
Icones Florae Alpinae Plantarum
Journal d'Agriculture Tropicale
Journal de Pharmacie et de Chimie
Journal de Physiologie et de Pathologie Générale
Journal de la Société Nationale d'Horticulture de France
Mémoires de l'Académie des Sciences, Inscriptions, et Belles-lettres, Toulouse
Mémoires de la Société Botanique de France
Mémoires de la Société Fribourgeoise des Sciences Naturelles Botanique
Mémoires de la Société Linneènne du Nord de la France
Mémoires de la Société des Sciences Physiques et Naturelles de Bordeaux
Notulae Systematicae
Palaeontologia Universalis
Progrés Agricole et Viticole
Recueil des Publications de la Société Havraise d'Études Diverses
Répertoire de Pharmacie: Archives de Pharmacie et Journal de Chimie Médicale
Revue d'Auvergne
Revue Bryologique
Revue des Eaux et Forêts
Revue Générale Botanique
Revue Générale des Sciences Pures et Appliquées
Revue Horticole
Revue de Viticulture

GERMANY

Abhandlungen der Leopoldinisch-Carolinischen Deutschen Akademie der Naturforscher
Abhandlungen des Naturwissenschaftlichen Vereins zu Bremen
Abhandlungen Senckenbergischen Naturforschenden Gesellschaft Frankfurt a/M
Allgemeine Botanische Zeitschrift
Allgemeine Forst- und Jagd-Zeitung
Anatomischer Anzeiger
Angewandte Botanik
Annalen der Chemie [Liebig]
Annales Mycologici
Annalen der Physik
Apotheker-Zeitung
Arbeiten aus der Biologischen Reichsanstalt für Land- und Forstwirtschaft
Arbeiten der Deutschen Landwirtschafts Gesellschaft
Archiv für Anatomie und Physiologie. Anatomische Abteilung
Archiv für Anatomie und Physiologie. Physiologische Abteilung
Archiv für Entwicklungsmechanik der Organismen
Archiv für Hydrobiologie und Planktonkunde
Archiv für Naturgeschichte Abteilung A

Archiv für Naturgeschichte Abteilung B
Archiv der Pharmasie
Archiv für Protistenkunde
Archiv für Rassen- und Gesellschafts-biologie
Archiv für Zellforschung
Beihefte zum Botanischen Centralblatt
Beiträge zur Biologie der Pflanzen
Beiträge zur Pathologischen Anatomie
Berichte der Deutschen Botanischen Gesellschaft
Berichte der Deutschen Chemischen Gesellschaft
Berichte der Naturforschenden Gesellschaft zu Freiburg in Breizgau
Bericht des Naturwissenschaftlichen Vereins Schwaben und Neuburg
Bericht der Senckenbergischenden Gesellschaft in Frankfurt a/M
Bibliotheca Botanica
Biochemische Zeitschrift
Biologisches Centralblatt
Blätter für Zuckerrübenbau.
Botanische Jahrbucher für Systematik Pflanzengeschichte und Pflanzengeographie
Centralblatt für Allgemeine Pathologie
Centralblatt für Bakteriologie und Parasitenkunde II Abt.
Centralblatt für die Zuckerindustrie
Deutsche Forstzeitung
Deutsche Landwirtschaftliche Presse
Ergebnisse der Hygiene, Bakteriologie, Immunitätsforschung und Experimentellen Therapie
Ergebnisse der Physiologie
Fermentforschung
Flora
Forstwissenschaftliche Centralblatt
Fühlings Landwirtschaftliche Zeitung.
Gartenflora
Gartenschönheit
Gartenwelt
Handelsbericht, Gehe & Co.
Hedwigia
Illustrierte Landwirtschaftliche Zeitung
Institut für Allgemeine Botanik Bericht
Internationale Mitteilungen für Bodenkunde
Jahrbücher der Nassauischen Vereins für Naturkunde
Jahrbucher für Wissenschaftliche Botanik
Jahresbericht über die Fortschritte der Physiologie
Jahresbericht über das Gebiet der Pflanzenkrankheiten
Jenaische Zeitschrift für Naturwissenschaft
Journal für Landwirtschaft
Kolloid Zeitschrift
Kolloidchemische Beihefte
Landwirtschaftliche Hefte
Landwirtschaftliche Jahrbücher
Landwirtschaftliche Jahrbücher Ergänzungsband
Landwirtschaftliche Versuchs-Stationen
Leopoldina
Mitteilungen des Badischen Landesvereins für Naturkunde und Naturschutz, Freiburg in Breizgau
Mitteilungen der Deutschen Dendrologischen Gesellschaft
Mitteilungen der Deutschen Landwirtschafts Gesellschaft
Mitteilungen des Thüringischen Botanischen Vereins
Möllers Deutscher Gärtnerzeitung
Monatschrift für Kakteenkunde
Naturwissenschaften
Notizblatt des Botanischen Gartens und Museums zu Berlin
Orchis
Palaeobotanische Zeitschrift
Pflanzenreich [Engler]
Pharmaseutische Zentralhalle für Deutschland
Praktische Blätter für Pflanzenbau und Pflanzenschutz
Progressus Rei Botanicae
Schriften der Naturwissenschaftlichen Vereins für Schleswig-Holstein
Sitzungsberichte Bayerischen Akademie der Wissenschaften (Mathematisch-Physikalische Klasse)
Sitzungsberichte Bayerischen Akademie der Wissenschaften (Philosophisch-Philologische Klasse)
Sitzungsberichte der Naturforschenden Gesellschaft zu Leipzig
Sitzungsberichte der Niederrheinischen Gesellschaft für Natur- u. Heilkunde zu Bonn
Sitzungsberichte Preussischen Akademie der Wissenschaften Berlin
Tharander Forstliches Jahrbuch
Verhandlungen des Naturhistorischen Vereins der Preussischen Rheinlände und Westfalens
Vorträge aus dem Gesammtgebiet der Botanik
Zeitschrift für Allgemeine Physiologie
Zeitschrift für Angewandte Chemie
Zeitschrift für Botanik
Zeitschrift für Forst- und Jagdwesen
Zeitschrift für Hygiene und Infektionskrankheiten
Zeitschrift für Immunitätsforschung und Experimentelle Therapie
Zeitschrift für Induktive Abstammungs-und Vererbungslehre
Zeitschrift für Instrumentkunde
Zeitschrift für Krebsforschung
Zeitschrift für Pflanzenkrankheiten
Zeitschrift für Pflanzenzuchtung
Zeitschrift für Physikalische Chemie
Zeitschrift für Physiologische Chemie
Zeitschrift für Technische Biologie
Zeitschrift für Tuberkulose
Zeitschrift für Untersuchung der Nahrungs-und Genussmittel
Zeitschrift Vereins der Deutschen Zuckerindustrie
Zeitschrift für Wissenschaftliche Mikroskopie
Zentralblatt für die Gesamte Landwirtschaft

GREAT BRITAIN AND IRELAND

Aberdeen and North of Scotland College of Agriculture Experimental Leaflet
Annals of Applied Biology
Annals of Botany
Annals and Magazine of Natural History
Annual Report of the Agricultural and Horticultural Research Station University of Bristol
Annual Report of the Experimental and Research Station, Waltham Cross
Board of Agriculture and Fisheries, Great Britain, Food Production Leaflets
Board of Agriculture and Fisheries, Great Britain, Leaflets
Board of Agriculture and Fisheries, Great Britain, Special Leaflets
Board of Agriculture and Fisheries, Great Britain, Miscellaneous Publications
Biochemical Journal
Biometrika
Botanical Memoirs [Oxford]
Botanical Society and Exchange Club of the British Isles Report
Bulletin of the Imperial Institute of the United Kingdom of Great Britain

Bulletin of the University College of Reading
Chemist and Druggist
Curtis Botanical Magazine
Economic Proceedings of the Royal Dublin Society
Gardeners' Chronicle
Geographical Journal
Glasgow Naturalist
Great Britain Colonial Reports
International Sugar Journal
Irish Naturalist
Journal of Agricultural Science
Journal of the Bath and Western and Southern Counties Society
Journal of Botany
Journal of Comparative Pathology and Therapeutics
Journal of the Department of Agriculture and Technical Instruction for Ireland
Journal of Ecology
Journal of Genetics
Journal of Hygiene
Journal of the Linnean Society Botany of London
Journal of the Marine Biological Association of the United Kingdom
Journal of the Ministry of Agriculture, Great Britain
Journal of the Ministry of Agriculture, Great Britain, Supplement
Journal of Physiology
Journal of Pomology
Journal of the Quekett Microscopical Club
Journal of the Royal Agricultural Society of England
Journal of the Royal Horticultural Society
Journal of the Royal Microscopical Society of London
Journal of the Royal Society of Arts
Journal of the Society of Chemical Industry
Journal of Tropical Medicine and Hygiene
London, Edinburgh and Dublin Philosophical Magazine
Memoirs and Proceedings of the Manchester Literary and Philosophical Society
Moss Exchange Club Annual Report
Nature
New Phytologist
North of Scotland College of Agriculture Bulletins
Notes from the Botanical School of Trinity College, Dublin
Notes of the Royal Botanic Garden of Edinburgh
Parasitology
Pharmaceutical Journal and Pharmacist
Philosophical Transactions of the Royal Society of London B
Proceedings of the Birmingham Natural History and Philosophical Society
Proceedings of the Cambridge Philosophical Society
Proceedings of the Royal Institution of London
Proceedings of the Royal Irish Academy
Proceedings of the Royal Society of Edinburgh
Proceedings of the Royal Society of London B
Proceedings and Transactions of the Liverpool Biological Society
Proceedings of the University of Durham Philosophical Society
Quarterly Journal of Forestry
Quarterly Journal of Microscopical Science
Quarterly Summary and Meteorological Readings of the Royal Botanic Society of London
Report of the British Association for the Advancement of Science
Report and Proceedings of the Belfast Natural History and Philosophical Society
Report of the Woburn Experimental Fruit Farm
Review of Bacteriology
Rhododendron Society Notes
Rothamsted Experimental Station Reports
Royal Botanic Gardens, Kew, Bulletin of Miscellaneous Information
Royal Botanic Gardens, Kew, Bulletin of Miscellaneous Information, Appendix
Scientific Proceedings of the Royal Dublin Society
Science Progress
School Science Review
Scottish Journal of Agriculture
Transactions and Annual Report of the Manchester Microscopical Society
Transactions of the British Mycological Society
Transactions of the Cambridge Philosophical Society
Transactions of the Highland and Agricultural Society of Scotland
Transactions of the Linnean Society of London
Transactions of the Natural History Society of Northumberland, Durham, and Newcastle-upon-Tyne
Transactions and Proceedings of the Botanical Society of Edinburgh
Transactions of the Royal Scottish Arboricultural Society
Transactions of the Royal Society of Edinburgh
Tropical Life
Tropical Veterinary Bulletin
West of Scotland Agricultural College Report
Yearbook of Pharmacy and Transactions of the British Pharmaceutical Conference

ITALY

Agricoltura Bolognese
Agricoltura di Terra Lavora
Annali del Museo Civico di Storia Naturale Giacomo Doria
Annali della R. Scuola Superiore d' Agricoltura di Portici
Annali della R. Stazione Sperimentale di Agrumicoltura e Frutticoltura, Acireale
Archivio di Fisiologie
Atti, R. Accademia dei Lincei, Roma, Rendiconti, Classe di Scienze Fisiche, Matematiche e Naturali
Atti, R. Accademia della Scienze di Torino
Atti della Società Toscana di Scienze Naturali residente in Pisa—Memoire
Atti della Società Toscana di Scienze Naturali, Pisa—Processi Verbali
Bollettino delle R. Orto Botanico di Palermo
Bolletino, Società Botanica Italiana
Bolletini della R. Stazione Sperimentale de Agrumicoltura e Frutticoltura di Acireale
Bollettino della Società di Naturalisti Napoli
Gazzetta Chimica Italiana
Giornale di Risicoltura
Malpighia
Memoria della R. Stazione de Patologia Vegetale Roma
Minerva Agraria
Nouvo Giornale Botanico Italiano
Nuova Notarisia
Pubblicazione Mensile, R. Osservatorio di Fitopatologia Torino
R. Istituto Lombardo di Scienze e Lettere Rendiconti
Rivista di Patologia Vegetale
Scientia
Sperimentale
Stazioni Sperimentali Agrarie Italiane
Studi e Ricerche della R. Universita di Pisa
Sylloge Fungorum [Saccardo]

THE NETHERLANDS

Aarde en haar Volkeren
Archives Néerlandaises des Sciences Exactes et Naturelles
Cultura
Folia Microbiologica
Jaarboek van de K. Akademie van Wetenschappen, Amsterdam
Jaarverslagen van het Instituut voor Phytopathologie Wageningen
Levende Natuur
Mededeelingen van de Landbouwhoogeschool en van de daaran Verbonden Instituten [Wageningen]
Mededeelingen van de Nederlandsche Mycologische Vereeniging
Mededeelingen, Phytopathologisch Laboratorium "Willie Commelin Scholten"
Mededeelingen vans' Rijks Herbarium
Mededeelingen van de Vereeniging tot Bevoordering van Wetenschappelijke Teelt
Mededeelingen v/h Vereeniging "Kolonial Instituut"
Natuur
Nederlandsch Kruidkundig Archief
Pharmaceutisch Weekblad
Proceedings of the Royal Academy of Science, Amsterdam
Recueil des Traveaux Botaniques Néerlandais
Tijdschrift der Nederlandsche Heidemaatschappij
Tijdschrift over Plantenziekten
Vereeniging "Kolonial Instituut" Jaarverslag
Verhandelingen 2 Sectie der K. Akademie van Wetenschappen, Amsterdam
Verslagen K. Akademie van Wetenschappen, Amsterdam
Verslagen van Landbouwkundige Onderzoekingen der Rijkslandbouwproefstations [Nederland]
Verslagen en Mededeelingen, Directie van Landbouw, Departement van Landbouw, Nijverheid en Handel [Nederland]
Verslagen en Mededeelingen van den Plantenziektenkundigen Dienst te Wagenginen
Verslag over de Werkzaamheiden van den Phytopathologischen Dienst te Wageningen
Vlugblatt, Phytopathologisch Laboratorium "Willie Commelin Scholten"
Weekblad voor Bloembollencultuur
Zittingsverslagen der K. Akademie van Wetenschappen, Amsterdam

NORWAY

Bergens Museums Aarbok Naturhistorisk Raekke
Bergens Museums Aarsberetning
Bilag til Tidsskrift for Skogbruk
Indberetning om det Norske Skogvaesen
Nyt Magazin for Naturvidenskaberne
Skrifter K. Norske Videnskabers Selskab
Tidsskrift for Skogbruk
Tromsö Museums Aarshefter
Videnskabs-selskabet i Christiania Forhandlinger Matematisk-Naturvidenskabelie Klasse
Videnskabs-selskabet i Christiania Skrifter Matematisk-Naturvidenskabelie Klasse

PORTUGAL

Broteria, Serie Botanica
Bulletin de la Société Portugaise des Sciences Naturelles
Mémoires publies par la Société Portugaise des Sciences Naturelles
Travaux de la Station de Biologie Maritime de Lisbonne

RUSSIA

Ezheghodnik Lyesnogho Departamenta
Izvyestiya Imperatorskagho Lyesnogho Instituta
Lyesnoi Zhurnal
Lyesopromuishlennuii Vyestnik
Russisches Journal für Experimentalle Landwirtschaft
Selskoe Khozyaistvo i Lyesovodstvo
Zhurnal Opytnoi Agronomia

SPAIN

Boletin de Agricultura Técnica y Económica [España]
Boletin, Asociacion de Agricultores de España
Boletin de la R. Sociedad Española de Historia Natural Informacion Agricole [Madrid]
Memorias de la R. Academia de Ciencias y Artes Barcelona
Memorias de la R. Sociedad Española de Historia Natural
Musei Barcinonensis Scientiarum Naturalium Opera Series Botanica
Revista del Instituto Agricola Catalan de San Isidro
Revista de la R. Academia de Ciencias Exactas Fisicas y Naturales [Madrid]
Trabajos del Museo Nacional de Ciencias Naturales—Ser. Bot.

SWEDEN

Acta Horti Bergiani
Arkiv for Botanik
Botaniska Notiser
Hereditas
Meddelanden från Statens Skogsförsöksanstalt
Skogen
Skogsvardsforeningens Tidskrift
Svensk Botanisk Tidskrift
Svensk Farmaceutisk Tidskrift

SWITZERLAND

Annuaire de la Conservatoire et Jardin Botanique Genève
Archives des Sciences Physiques et Naturelles [Genève]
Berichte der Schweizerische Botanische Gesellschaft
Bulletin de la Société Botanique de Genève
Bulletin de la Société Vaudoise des Sciences Naturelles
Comptes Rendus des Séances de la Société de Physique et d'Histoire Naturelle de Genève
Journal Forestier Suisse
Landwirtschaftliches Jahrbuch der Schweiz
Mémoires de la Société Fribourgeosie des Sciences Naturelles Botanique
Mémoires de la Société de Physique et d'Histoire Naturelle de Genève
Mitteilungen Naturforschenden Gesellschaft, Bern
Mitteilungen der Schweizerische Centralanstalt für das Forstliche Versuchswesen
Schweizerische Apotheker-Zeitung
Schweizerische Zeitschrift für Fortwesen
Verhandlungen der Naturforschenden Gesellschaft, Basel
Vierteljahresschrift der Naturforschenden Gesellschaft in Zurich

NORTH AMERICA

ALASKA

Alaska Agricultural Experiment Station Bulletin
Alaska Agricultural Experiment Station Circular
Report of the Alaska Agricultural Experiment Station

CANADA

Agricultural Gazette of Canada
Agricultural Journal [British Columbia]
Annual Report of the British Columbia Fruit Growers Association
Annual Report of the Department of Agriculture, Prince Edward Island
Annual Report, Fruit Growers Association of Nova Scotia
Annual Report, Fruit Growers Association Prince Edward Island
Annual Report of the Quebec Society for the Protection of Plants
Annual Report, Secretary for Agriculture Nova Scotia
British Columbia Annual Report of the Department of Agriculture
British Columbia Department of Agriculture Bulletin
British Columbia Department of Agriculture Circular
British Columbia Department of Agriculture Circular Bulletin
British Columbia Department of Agriculture Circular New Horticultural Series
Bulletin of the Natural History Society of New Brunswick
Canadian Alpine Journal
Canadian Field Naturalist
Canadian Horticulturist
Canadian Seed Growers' Association Annual Report
Department of the Interior, Canada, Forestry Branch Bulletin
Department of the Interior, Canada, Forestry Branch Circular
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Illustrated Canadian Forestry Magazine
Naturaliste Canadien
Proceedings of the Natural History Society of Montreal
Proceedings and Transactions of the Nova Scotia Institute of Science
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Province of New Brunswick, Department of Agriculture Bulletin
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Pulp and Paper Magazine
Report on Agriculture for the Province of New Brunswick
Report of the Herbarium and Botanical Garden, University of British Columbia
Report of the Horticultural Experiment Station Vineland Station Ontario
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Scientific Agriculture
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MEXICO AND CENTRAL AMERICA

Agricultor Mexicano y Hogar
Boletin de la Camara Agricola Nacional de Leon
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UNITED STATES

Abstracts of Bacteriology
Addisonia
Advance Sheets, Field Operations of the U. S. Bureau of Soils
Alabama Agricultural Experiment Station Bulletin
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Alabama Geological Survey Bulletin
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American Botanist
American Cranberry Growers' Association, Proceedings of the Annual Convention
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American Druggist and Pharmaceutical Record
American Fern Journal
American Fertilizer
American Forestry
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American Naturalist
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American Seedsman
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Annals of the Carnegie Museum
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Annals of the New York Academy of Sciences
Annual Report Demonstration Farms for North Dakota
Annual Report of the Indiana State Board of Forestry
Annual Report of the Maryland Agricultural Experiment Station
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Arkansas Agricultural Experiment Station Bulletin
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Associated Grower
Astro-Physical Journal
Better Fruit
Biennial Report of the Montana State Board of Horticulture
Biennial Report of the State Forester California
Biological Bulletin
Botanical Gazette
Brooklyn Botanic Garden Memoirs
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Bryologist
Bulletin of the Buffalo Society of Natural History
Bulletin of the Illinois Natural History Survey
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Bulletin of the Vermont Botanical and Bird Clubs
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Bulletin of the Wisconsin State Conservation Commission
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Carnegie Institution of Washington Publications
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Colorado Agricultural Experiment Station Bulletin
Colorado College Publications Science Series
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Contributions from the Botanical Laboratory of the University of Pennsylvania
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Cornell University Agricultural Experiment Station Memoirs
Delaware Agricultural Experiment Station Bulletin
Director's Report, Kansas Agricultural Experiment Station
Druggist
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Ecology
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Field Museum of Natural History Publications Botanical Series
Florida Grower
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Georgia Experiment Station Bulletin
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Horticulture
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Journal of the Academy of Natural Sciences of Philadelphia
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Michigan Agricultural Experiment Station Bulletin
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Minnesota Horticulturist
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Sugar
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Texas Agricultural Experiment Station Forestry Bulletin
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Transactions of the Connecticut Academy of Arts and Sciences
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Tufts College Studies Science Series
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University of Iowa Studies in Natural History
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University of Michigan Museum of Zoology Miscellaneous Publications
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University of Nevada Studies
University of Oklahoma Research Bulletin
University Studies of the University of Nebraska
University of Texas Bulletin Scientific Series
University of Wisconsin Studies in Science
U. S. Biological Survey Bulletin
U. S. Department of Agriculture Bulletins
U. S. Department of Agriculture Department Circular
U. S. Department of Agriculture Farmers Bulletin
U. S. Department of Agriculture Yearbook
Utah Agricultural Experiment Station Bulletin
Utah Agricultural Experiment Station Circular
Vermont Agricultural Experiment Station Bulletin
Vermont Agricultural Experiment Station Circular
Veterinary Medicine
Virginia Agricultural Experiment Station Annual Report
Virginia Agricultural Experiment Station Bulletin
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Western Druggist
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Wisconsin Agricultural Experiment Station Research Bulletin
Wisconsin Horticulture
World Agriculture
Wyoming Agricultural Experiment Station Annual Report
Wyoming Agricultural Experiment Station Bulletin

PHILIPPINE ISLANDS

Bureau of Agriculture, [Philippine Islands] Bulletin
Bureau of Forestry [Philippine Islands] Bulletin
Bureau of Forestry [Philippine Islands] Circular
Bureau of Science [Philippine Islands] Publications
Leaflets of Philippine Botany
Philippine Agriculturist
Philippine Agricultural Review
Philippine Journal of Science

POLYNESIA

FIJI ISLANDS

Department of Agriculture, Fiji, Bulletin
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HAWAII

Experiment Station Hawaiian Sugar Planters' Association Agricultural and Chemical Series Bulletin
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Experiment Station Hawaiian Sugar Planters' Association Pathological and Physiological Series Bulletin
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Hawaii Agricultural Experiment Station Extension Bulletin
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Memoirs Bernice Pauahi Bishop Museum
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Report of the Board of Commissioners of Agriculture and Forestry, Territory of Hawaii
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SOUTH AMERICA

ARGENTINA

Anales del Museo Nacional de Historia Natural Buenos Aires
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Publicaciones de la Universidad de Tucuman
Revista Industrial y Agricola de Tucuman
Revista del Museo de La Plata
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Surco

BRAZIL

Memorias do Instituto Oswaldo Cruz

BRITISH GUIANA

Journal of the Board of Agriculture, British Guiana

CHILE

Agricultor [Santiago]
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DUTCH GUIANA

Bulletin, Departement van Landbouw Suriname
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ECUADOR

Boletin del Laboratorio Municipal de Guayaquil

URUGUAY

Anales del Museo Nacional de Montevideo
Boletin de la Comision Nacional de Fomento Rural [Uruguay]
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WEST INDIES

BRITISH WEST INDIES

Agricultural News [Barbados]
Bulletin of the Department of Agriculture, Jamaica
Bulletin of the Department of Agriculture, Trinidad and Tobago
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Proceedings of the Agricultural Society of Trinidad
Report on the Agricultural Department of Antigua
Report on the Agricultural Department, British Virgin Islands
Report on the Agricultural Department of Dominica
Report on the Agricultural Department, Grenada
Report on the Agricultural Department, Montserrat
Report on the Agricultural Department, St. Kitts-Nevis
Report on the Agricultural Department, St. Lucia
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Report on the Sugar Cane Experiments, Department of Agriculture, Barbados
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CUBA

Anales, Academia de Ciencias Médicas, Fisicas y Naturales de la Habana—Revista Cientifica
Estacion Experimental Agronomica [Cuba] Boletin
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Seccion de Sanidad Vegetal, Secretaria de Agricultura, Comercio y Trabajo [Cuba] Boletin
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DOMINICAN REPUBLIC

Revista de Agricultura [Santo Domingo]

FRENCH WEST INDIES

Journal de la Station Agronomique de la Guadeloupe
Station Agronomique de la Guadeloupe Bulletin

PORTO RICO

Journal of the Department of Agriculture of Porto Rico
Porto Rico Agricultural Experiment Station Bulletin
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Revista de Agricultura de Puerto Rico

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ENTRIES 1-382

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BOTANICAL ABSTRACTS

A monthly serial furnishing abstracts and citations of publications in the international field of botany in its broadest sense

PUBLISHED MONTHLY UNDER THE DIRECTION OF

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J. R. SCHRAMM, Editor-in-Chief
Cornell University, Ithaca, New York

Vol. X NOVEMBER, 1921 No. 1

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AGRONOMY

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(See also in this issue Entries 75, 80, 93, 100, 148, 195, 198, 230, 240, 248, 286, 303, 315, 316, 380, 381, 382)

1. ANONYMOUS. **Dollar wheat.** Agric. Gaz. New South Wales 32: 434. 1921.—The variety originated in Victoria. Although of promise, it yields less than standard varieties.—*L. R. Waldron.*

2. BLOCK, AUGUST. **Praktische Erfahrungen über den Anbau von Schmetterlingsblütlern. [Practical experience in the culture of legumes.]** Mitteil. Deutsch. Landw. Ges. 36: 278–281. 1921.—The author gives an account of methods of culture for beans, peas, and especially clovers. The need for lime on clover is emphasized, and it is pointed out that a light top dressing of nitrogen in the spring makes it possible to cut the 1st crop much earlier than usual. The great benefits to hoed and grain crops following clovers are mentioned, and some estimates are given of increases due to the clover sod.—*A. J. Pieters.*

3. CALVINO, MARIO. **El Zacate blanco de Honduras. (Ixophorus unisetus Sch.) [The white hay of Honduras.]** Rev. Agric. Com. y Trab. [Cuba] 3: 364–366. *3 fig.* 1920.—This gramineous plant (*Ixophorus unisetus* Sch.) was tried as a forage crop on several kinds of soil in Cuba. For best results the seed was planted in a seed bed and transplanted. Watering was necessary in the light dry soils where the first trials were made. In the first 3 cuttings of the 1st year crops up to 99,703 kgm. per hectare were secured. A chemical analysis is given which indicates that as a forage it is richer than *Panicum barbinode* or *P. maximum.*—*F. M. Blodgett.*

4. CUTLER, G. H. **Pure seed distribution and the method employed in Alberta.** Sci. Agric. [Canada] 1: 82–84. 1921.—The author discusses the Alberta Crop Improvement Association, dealing with objects, membership, cooperative experiments, and seed growing centers.—*B. T. Dickson.*

5. FITZ, L. A. **Kanred: the new Kansas wheat.** Operative Miller 25: 284–285. 1920.—Varietal comparisons with Karkof and Turkey, 2 standard hard red winter wheats, conducted at the Kansas Agricultural Experiment Station during the 8 years, 1912–1919 inclusive, show that Kanred outyielded the other varieties by 2.9 and 3.8 bushels respectively. The average

bushel weight and percentage of flour yield also were higher. The protein content of both wheat and flour was higher and the loaf expansion greater.—*Carleton R. Ball.*

6. Franck, W. J. **Het onderzoek van Cietenzaad aan het Rykspoefstation voor Zaadcontrole. [Examination of beet seed in the government agricultural experiment stations for seed-control.]** Cultura 33: 155–168. *1 pl.* 1921.—The author discusses for beet seed sampling of seed, germination of seed, examination of water contents, purity of the variety, and occurrences of disease.—*J. C. Th. Uphof.*

7. Gerlach. **Die Ernährung der landwirtschaftlichen Culturpflanzen im zeichen des Phosphorsäuremangels. [Fertilizing agricultural plants in view of phosphoric acid shortage.]** Arbeit. Deutsch. Landw. Ges. 300. 79–91. 1919.—The author reviews some of the work on fertilizer experiments to bring out the influence of phosphoric acid. He points out that the quantities of phosphoric acid that had commonly been applied were greatly in excess of those removed by crops, and concludes that the greatest part of the mineral soils in the German Empire contained before the war such considerable quantities of active phosphoric acid combinations that, under a regular stable-manure agriculture, the application of phosphoric acid may be reduced or omitted without material decrease in yields.—*A. J. Pieters.*

8. Hansen. **Die Fütterung unter besonderer Berücksichtigung des Eiweiszmangels. [Feeding with especial reference to the lack of albuminoids.]** Arbeit. Deutsch. Landw. Ges. 300. 68–78. 1919.—A general review is presented of sources of proteins for feeding purposes. The author suggests a more extensive culture of legumes and oil-producing seeds. The American and the Swiss systems of making silage are compared; the results of 1 experiment are reported to show that there is a much greater loss of proteids in the American silo than in the Swiss fermentation chamber.—*A. J. Pieters.*

9. Hansen, R. **Symbiotic nitrogen-fixation by leguminous plants with special reference to the bacteria concerned.** Sci. Agric. [Canada] 1: 59–62. 1921.—The present paper, read before the Western Canadian Society of Agronomy, deals with the work of the author in conjunction with the late T. J. Burrill in Illinois. It was shown that the root nodules of other than leguminous plants are not caused by the bacteria which are found in the nodules of Leguminosae. Leguminous plants may be grouped according to whether or not they can be cross-inoculated by certain bacteria. This grouping may depend on similarity of cell sap in root tissues, or on the existence of specific enzymes secreted by the bacteria.—*B. T. Dickson.*

10. Lehmann, E. **Die Grundlagen der Fütterungslehre einst und jetz. [The fundamentals of feeding theories, past and present.]** Arbeit. Deutsch. Landw. Ges. 300. 48–67. 1919.—The author reviews past and current theories governing the study of the value of feedstuffs.—*A. J. Pieters.*

11. Little, L. G. **Field experiments with cereals. Glen Innes experiment farm.** Agric. Gaz. New South Wales 32: 403–409. 1921.—In trials of early and mid-season wheats sown for grain, Clarendon and Early Haynes Bluestem yielded decidedly highest and these varieties resisted rust. Early Haynes Bluestem gave the highest hay yield.—In trials of late-sown wheats, Cleveland yielded 32 bushels followed by Red Fife, 22; Kanred, 20; Huron, 18; Marquis, 17; Haynes Bluestem, 16; Kharkov, 9; and Red Rock, 2. Kanred showed practically no rust while Haynes rusted badly.—In oat-variety trials Smyrna stood highest in yield of grain and second in hay yield. Fulghum, Kherson, and Sixty Day gave rather low yields.—*L. R. Waldron.*

12. Maiden, J. H. **Four newly recorded weeds.** Agric. Gaz. New South Wales 32: 396. 1921.—Brief notes are given on *Calandrinia caulescens Menziesii* (HBK) Gray, *Sisymbrium altissimum* L., *Orthocarpus purpurascens* Benth., and *O. erianthus* Benth.—*L. R. Waldron.*

13. Merkel. Sortenversuchsbericht. Saatzucht-Abteilung. **[Report on variety tests. Seed breeding section.]** Mitteil. Deutsch. Landw. Ges. 36: 308–313. 1921.—The author

briefly reviews the work of the section for previous years and reports on the results of variety tests of barley, rye, wheat, oats, and beans for the year 1919–20.—*A. J. Pieters.*

14. MILLER, M. F., AND R. R. HUDELSON. **Thirty years of field experiments with crop rotation, manure and fertilizers.** Missouri Agric. Exp. Sta. Bull. 182. *43 p.* 1921.—Results of Missouri rotation experiments for 30 years, beginning with 1888, are reported, and all yield data are detailed in an appendix. The rotations included: (1) Corn, oats, wheat, clover, timothy, timothy; (2) corn, oats, wheat, clover; (3) corn, wheat, clover; and (4) wheat, clover. In addition, each of the crops was grown continuously on the same land. All cropping systems were used both with a manure application of 6 tons annually and with no fertilizer treatment. Also, commercial fertilizers were used on many of the plots.—In general, crop rotations gave better yields than were secured from crops grown continuously without rotations, and the 4-year rotation,—corn, oats, wheat, clover,—gave best results. Crop rotation without manure was practically as effective in maintaining the yields of corn and wheat as was heavy manuring without rotation. Manure was more effective than heavy chemical fertilizers in maintaining the yield of corn and grass in rotations, but the reverse was true in the case of wheat and oats. Soil analyses at the end of 25 years indicated that the most important factor in the soil exhaustion was the loss of nitrogen and organic matter. The supply of nitrogen in the continuous culture plots without fertilizer or manure was reduced most rapidly by corn and least rapidly by timothy. The supply of soil nitrogen was much more effectively maintained by heavy applications of barnyard manure than by heavy applications of chemical fertilizers. Continuous cropping to grass reduced the supply of soil nitrogen less than crop rotation.—*L. J. Stadler.*

15. POPP, M. **Süsspressfutter aus Duwockgrass.** [Sweet silage from Duwockgrass.] Mitteil. Deutsch. Landw. Ges. 36: 301–302. 1921.—Duwockgrass, *Equisetum palustre*, is poisonous if fed as new hay but can be ensiled and the ensilage used with safety and profit. The author believes that the poisonous alkaloid, equisetin, which is known to be very unstable at higher temperatures, is destroyed by the heat due to fermentation.—*A. J. Pieters.*

16. ROOT, A. I. **Still another new sweet clover.** Gleanings in Bee Culture 49: 302. 1921.—Notes are given on varieties of sweet clover (*Melilotus alba*).—*J. H. Lovell.*

17. ROOT, A. I. **The new annual sweet clover.** Gleanings in Bee Culture 49: 374. 1921.—It has been proposed to call the new annual sweet clover "Hubam clover."—*J. H. Lovell.*

18. RUDKIN, S. **Harvest report. Nyngan experiment farm.** Agric. Gaz. New South Wales 32: 391–392. 1921.—Yields are given of wheat and oats from large fields of the experimental farm.—*L. R. Waldron.*

19. SAUNDERS, C. E. **The effects of premature harvesting on the wheat kernel.** Sci. Agric. [Canada] 1: 74–77. 1921.—The author gives an account of part of his work on the early cutting of wheat in 1917. One hundred heads of previously marked Marquis wheat were gathered every 2nd or 3rd day from July 21 to Aug. 15 in 4 groups according to length of straw retained. The average weight of 1,000 kernels from heads with 3-inch straw was practically the same as from that of full length straw with roots, owing to the very rapid drying of the straw. Taking into consideration the daily growth in weight of 1,000 kernels and the mean daily temperatures, it is shown that the period of greatest daily gain occurred from July 25 to Aug. 2, with a normal maximum on July 29. It would appear, therefore, that in ordinary Ontario summers there would be little loss to the wheat crop if cut about a week before the ordinary date and allowed to ripen in the stook.—*B. T. Dickson.*

20. SHEPHERD, A. N. **Farmers' experiment plots. Grain trials, 1920. On and adjacent to Murrumbidgee irrigation areas.** Agric. Gaz. New South Wales 32: 393–395. 1921.—Trials with wheat were conducted cooperatively with 4 farmers, no irrigation being practiced; the varieties used were not the same for the 4 farms. In fertilizer trials, superphosphates generally caused marked increases in yield.—*L. R. Waldron.*

21. Wacker. **Ölfrüchte und Gespinstpflanzen.** [Oil and fiber plants.] Arbeit. Deutsch. Landw. Ges. 300. 102–116. 1919.—The author calls attention to the decrease between 1878 and 1913 in the areas devoted to the culture of various oil-producing plants and hemp, and discusses the kinds and varieties that could and should be grown in Germany, together with cultural directions.—*A. J. Pieters.*

22. Whittet, J. N. **Lucerne seed crop competition at Coolah.** Agric. Gaz. New South Wales 32: 419. 1921.—Results are given of a competition for a prize offered for the best 5 acres of lucerne crop carrying seed in the CoolahValley. The best crops of seed were produced in the localities where water can be obtained at a depth of from 18 to 25 feet.—*L. R. Waldron.*

BIBLIOGRAPHY, BIOGRAPHY AND HISTORY

Neil E. Stevens, *Editor*

(See also in this issue Entries 45, 126, 235)

23. Anonymous. **[Hermann Vöchting.]** Leopoldina 54: 60. 1918.—His botanical contributions are briefly reviewed. From 1887 until his death in November, 1917, Dr. Vöchting was professor of botany at Tübingen. His studies on internal growth-factors and polarity, on genetics, on the movements of flowers and fruits, on the influence of light on flower development, on phyllotaxy and on floral anomalies, are indicative of his special fields of investigation.—*A. W. Evans.*

24. Anonymous. **Robert Allen Rolfe.** Nature 107: 276–277. 1921.—Rolfe was born at Ruddington, May 12, 1855, and died April 13, 1921. He was an assistant in the herbarium at Kew for over 40 years. He was known as an authority on Orchidaceae, and in 1893 founded the Orchid Review, which he edited and to which he contributed largely.—*O. A. Stevens.*

25. Arthur, J. C. **Specialization and fundamentals in botany.** Amer. Jour. Bot. 8: 275–285. 1921.—The author asks for mutual good will, confidence and generosity among botanical workers. He decries overspecialization, particularly when it leads to neglect of intimate acquaintance with plants as living objects having distinctive names and varied relationships. He holds that plant names should be used for identification only, and not as qualifying terms, and bespeaks consideration for any attempts to secure exact names, uniformly applied. He advocates the preservation and advancement of the democratic quality in botanical work, with full cooperation between institutions and between individuals, but pleads for individual freedom as against too great encroachment by the machinery of organization. "The consistent, effective onward march of botany calls for careful balance between the attention given to specialization and that given to fundamentals."—*E. W. Sinnott.*

26. Cumming, M. **The Junius of Nova Scotia.** Sci. Agric. [Canada] 1: 55–58. 1921.—An account is presented of a series of letters written by John Young (1773–1837), the first Secretary of Agriculture for Nova Scotia, under the pen-name of "Agricola," which brought about a complete change in the agricultural affairs of the province, replacing depression by prosperity.—*B. T. Dickson.*

27. McCallum, A. W. **Abstracts of Canadian plant pathological literature.** Sci. Agric. [Canada] 1: 78–80. 1921.—Abstracts of, and references to, plant disease literature appearing in Canadian publications during 1919 and 1920 are presented.—*B. T. Dickson.*

28. Turney, A. G. **Pomological progress in New Brunswick.** Sci. Agric. [Canada] 1: 175–177. 1921.—An account is given of the work of Francis P. Sharp (born 1825) and his son, Franklin Sharp (died 1892) in the production of new varieties and development of the apple industry of New Brunswick.—*B. T. Dickson.*

29. Zavitz, C. A. **History and development of the Ontario Agricultural College.** Sci. Agric. [Canada] 1: 101–105. *Illus.* 1921.

BOTANICAL EDUCATION

C. Stuart Gager, *Editor*
Alfred Gundersen, *Assistant Editor*

30. Anonymous. **Imperial forestry education.** Nature 107: 315–316. 1921.—The report of the Interdepartmental Committee on Imperial Forestry Education recommends a 3-year course at a university, followed by 1 or more years at the central institution. It is recommended that the latter be located at Oxford and affiliated with the University.—*O. A. Stevens.*

31. Anonymous. **Science for all. Outline of the course.** School Sci. Rev. 2: 203–212. 1920.—A course of study by subjects on living and non-living things is presented under Courses on Living Things.—*Ellen Eddy Shaw.*

32. Anonymous. [Rev. of: Fritch, F. E., and E. J. Salisbury. **An introduction to the structure and reproduction of plants.** *vii + 458 p., 2 pl.* G. Bell and Sons: London, 1920.] Nature 107: 200. 1921.—"As a reference book for first-year university students, it is the most useful we have seen."—*O. A. Stevens.*

33. Anonymous. **Study of plants in the field.** [Rev. of: Horwood, A. R. **The outdoor botanist.** *284 p., 20 pl.* T. Fisher Unwin: London, 1920.] Nature 107: 293–294. 1921.—The chapter on ecology contains foreign material which is fragmentary and incoherent. Frequent misleading and contradictory statements are made. Many of the illustrations are good.—*O. A. Stevens.*

34. Anonymous. [Rev. of: Martin, J. N. **Botany with agricultural applications.** *2nd ed., xii + 605 p.* John Wiley and Sons: New York; Chapman and Hall: London, 1920.] Nature 107: 168. 1921.

35. Hopping, Aleita. **Organization of biology and related sciences in city high schools.** School Sci. and Math. 21: 463–472. 1921.

36. Johnson, Arthur M. **The use of the textbook in beginning classes in botany.** School Sci. and Math. 21: 573–577. 1921.

CYTOLOGY

Gilbert M. Smith, *Editor*
Geo. S. Bryan, *Assistant Editor*

(See in this issue Entries 81, 101, 107, 123, 124, 135, 308)

ECOLOGY

Henry C. Cowles, *Editor*
G. D. Fuller, *Assistant Editor*

(See in this issue Entries 60, 128, 178, 179, 249, 323, 326, 327, 329, 336, 354, 371, 372, 374, 377)

FORESTRY

RAPHAEL ZON, *Editor*

(See also in this issue Entries 30, 150, 215, 329)

37. ANONYMOUS. **British Empire timbers.** Australian Forest. Jour. **3**: 86–87. 1920; **4**: 18–19, 56–58, 86–87, 146–148. 1921.—The article gives a very brief statement of forest conditions in Bermuda, British Guiana, Cyprus, Gold Coast Colony, South Africa, Southern Rhodesia, British India, British East Africa, Nyasaland and Uganda, the Bahamas, the Malay Peninsula, and brief notes on the leading commercial species and forest products of each dominion.—*C. F. Korstian.*

38. ANONYMOUS. **Diseases of trees.** Australian Forest. Jour. **4**: 53–54. 1921.—The note directs attention to the need for investigating forest-tree diseases.—*C. F. Korstian.*

39. ANONYMOUS. **Education of forest apprentices.** Australian Forest. Jour. **4**: 52. 1921.—A note is presented on the training of lower-grade forest officers of the Western Australia Forest Department.—*C. F. Korstian.*

40. ANONYMOUS. **Fire-resisting properties of eucalypt timbers.** Australian Forest. Jour. **4**: 55–56. 1921.—The note stresses the fire-resistant qualities of eucalypt structural timbers.—*C. F. Korstian.*

41. ANONYMOUS. **Poisoning green timber.** Australian Forest. Jour. **4**: 108–109. 1921.—Girdling and the killing of trees with arsenic are discussed.—*C. F. Korstian.*

42. ANONYMOUS. **Ueber Brennkraft und Heizwert der verschiedenen Hölzer. [The heating value of various woods.]** Wiener. Allg. Forst- u. Jagdzeitg. **38**: 215. 1920.—Heating value depends upon specific gravity and resin content. A listing of woods from "Der Holzmarkt" is given, including 11 species ranging from maple with a value of 1011 to willow with 508 (relative values for equal volumes, based on hornbeam = 1000). A list by PRESSLER is given, including 16 species ranging from 104 for maple to 53 for willow (based on red beech = 100). A list by TUCHSCHMIED (8 species air dry) runs from 2427 heat units per cubic decimeter for hornbeam to 1698 for fir, and per kilogram from 3571 for pine to 3070 for ash. A list of 12 species by Tuchschmied having equal moisture contents runs from 103 for hornbeam to 68 for linden (based on beech = 100). The species included in one or more lists are *Carpinus betulus, Fagus silvatica, Acer* spp., *Quercus* spp., *Fraxinus excelsior, Betula alba, Pinus sylvestris, P. austriaca, Picea excelsa, Alnus* spp., *Populus* sp., *P. tremula, Salix* spp., *Ulmus campestris, Abies pectinata, Larix europaea,* and *Tilia* sp.—*F. S. Baker.*

43. ANONYMOUS. **Forestry in the United States.** [Rev. of: (1) ISE, J. **The United States forest policy.** *395 p.* Yale Univ. Press: New Haven; Humphrey Milford: London, 1920. (2) RECKNAGEL, A. B., AND J. BENTLEY, JR. **Forest management.** *xiii + 269 p., 3 pl.* John Wiley and Sons: New York; Chapman and Hall: London, 1919. (3) BROWN, N. C. **Forest products; their manufacture and use.** *xix + 471 p.* John Wiley and Sons: New York; Chapman and Hall: London, 1919.] Nature **107**: 326–327. 1921.—The 1st and 3rd are regarded as good; the 2nd is not elementary enough for private owners and managers.—*O. A. Stevens.*

44. ARCHER, ERLING. **Om tömmerets form i Glommens og Drammens vasdrag. [Form of timber in Glommen and Drammen watersheds, Norway.]** Bilag Tidsskr. Skogbruk **28**[9/10]: 57–122. 1920.—Results are presented of an investigation of the form of the timber of Scotch pine and Norway spruce in the 2 principal lumbering regions in Norway, by the Norwegian Forest Experiment Station. The dimensions of logs for different parts of the tree, the method of obtaining the measurements, the construction of the graphs and tables, and the volume tables for logs of different lengths and top diameter in cubic contents are given.—*J. A. Larsen.*

45. Archer, Erling. **Skogforsögsvaesenets oprettelse og forste virksomhet. [Establishment of the forest experiment station (Norway) and its first endeavors.]** Bilag Tidsskr. Skogbruk $28^{9/10}$ 1–28. 1920.

46. Bruce, Donald. **The campaign for private forestry.** Sierra Club Bull. **1921**: 171–174. 1921.

47. Clark, J. **Forest entomology in Western Australia.** Australian Forest. Jour. **4**: 142–144. 1921.—The trend of practical forest entomology in Western Australia and the need for further work on the life histories and habits of insects injurious to forest trees are briefly discussed.—*C. F. Korstian.*

48. Dawkins, C. G. E. **Notes on an attack of Pyrausta machoeralis on teak in Zigon and Tharrawaddy in 1920.** Indian Forest. **47**: 209–213. 1921.—Forest plantations of teak were completely defoliated, the damage being especially noticeable in stands from 10 to 20 feet in height. Leaves appeared again on the lower portions of the stem but the tops were killed. The only possible way of saving the trees is to coppice the stand. Preliminary observations appear to show no decrease in girth growth. It appears that the insects have run their course and are disappearing.—*E. N. Munns.*

49. Fowler, R. A. **Australian hardwoods for paper-making.** Australian Forest. Jour. **4**: 144–146. 1921.—A note is presented on paper-making from Australian hardwoods pulped by the soda and mechanical processes.—*C. F. Korstian.*

50. Gill, Walter. **Annual progress report upon state forest administration in South Australia for the year ended June 30th, 1920.** Ann. Progress Rept. Woods and Forests Dept. South Australia *12 p., 12 fig., 4 maps.* Adelaide, 1920.—This is the routine administrative report for the fiscal year. The work of the department is briefly summarized under the following captions: "Area of forest reserves and plantations, areas enclosed for planting operations, general account of the year's planting and other forest operations, exhibits at the peace conference, interstate forest conference, and officers of the department." There are appended detailed statements of trees planted during the year and the number that survived, receipts and expenditures for the year, comparative revenues, expenditures, and legislative provision for the past 44 years, and lands purchased from the loan under act 1028/10 for purposes of afforestation.—*C. F. Korstian.*

51. Götsche, O., F. Kiörbie, C. Bistrup, og C. W. Ahlefeldt-Laurvig. **Dansk skovforenings forsögsskure af svensk og dansk rödgran. [Tests of sheds of Danish and Swedish red spruce made by the Danish forest association.]** Dansk Skovforenings Tidsskr. **5**:182–191.1920.—Red spruce, *Picea excelsa,* appears to be a trade name. In order to settle a dispute as to the relative durability of these 2 grades for construction purposes test sheds were erected, one from each species. The results show that Danish spruce is in no respect inferior to the Swedish.—*J. A. Larsen.*

52. Grieve, J. W. A. **The management of the Punjab irrigated plantations as self-contained forest estates on commercial lines.** Indian Forest. **47**: 103–109. 1921.—There are 62,000 acres of irrigable land in Punjab, of which 9605 have been planted. From this planted area, a return of over 18 rupees per acre has been received annually. To put the balance of these lands under proper forestry would require a considerable increase in the forestry staff. The necessary service to handle this work is given in detail.—*E. N. Munns.*

53. Hiley, W. E. **The financial rotation for larch.** Quart. Jour. Forest. **15**: 122–127. *2 fig.* 1921.—If the cost of the land does not exceed £20 per acre, the financial rotation does not exceed 40 years for 2nd quality woods or 30 years for 1st quality. Second quality woods should not be cut under 30 years unless unusually high prices are obtained, but 1st quality woods may be cut at 25 years if the cost of land does not exceed £10. Planting 1st quality larch soil bought at £25 per acre is a better financial investment than planting 4th quality larch soil obtained for £1 per acre.—*C. R. Tillotson.*

54. Howard, M. S. **A forestry enabling law.** Jour. Forest. 19: 500–505. 1921.—The methods advocated for reforestation call for the expenditure of large sums of money by the governmental agencies or by individuals or corporations. Most of the latter class do not consider it possible to undertake such measures now. The reforestation could be made secure by giving a bond and taking a mortgage on the property to be released at the time of timber harvesting.—*E. N. Munns.*

55. Jones, Owen. **Forestry in relation to engineering and architecture.** Australian Forest. Jour. 4: 132–134. 1921.—This paper discusses forestry principles and the importance to engineering and architecture of adequate timber supplies.—*C. F. Korstian.*

56. Kay, James. **The more important trees of British Columbia.** Quart. Jour. Forest. 15: 134–142. 1921.—A dendrological description is given of *Pseudotsuga taxifolia, Tsuga heterophylla,* and *Thuja plicata.*—*C. R. Tillotson.*

57. Kellogg, R. S. **Notes upon the paper industry and the pulpwood supply.** Jour. Forest. 19: 495–499. 1921.—The consumption of paper has risen in this country to nearly 8 million tons per year, or 147 pounds per capita. The decreased supplies and increased uses and demand have made it possible for the forester to prove the truth of his assertions to the manufacturers. It should be possible to pay as high as 15 dollars per acre for the land and restock it, and, with an annual protection charge, give a return of 6 per cent on the investment. Yields of 20 cords per acre in 40 years are predicted with a return of more than 10 dollars per cord.—*E. N. Munns.*

58. Krogness, C. **Om temperaturmaalingerne i skogsdistrikterne i Nord-Norge sommeren 1919. [The temperature observations in the forests in northern Norway summer 1919.]** Bilag Tidsskr. Skogbruk 28$^{9/10}$: 39–56. 1920.—Fifteen stations have been installed for the purpose of studying more closely the relation between air temperature and seed production along the northern timber-line in Norway. It has been found by borings and silvical study that successful natural reproduction periods are about 100 years apart, not because the seed is produced so seldom but because favorable temperature conditions for blossoming and seed ripening require 3 seasons of relatively high air temperature. Dr. Hagem of the Bergen experiment station has found by testing pine seed from different parts of Norway, including that from the northern timber-line, that the latter is practically worthless, and that a mean air temperature of at least 10.5°C. must prevail during the period of ripening. During some seed years the average temperature often falls below this in the northern section.—*J. A. Larsen.*

59. Llewelyn, William Craven. **Forest soils of Wales.** Quart. Jour. Forest. 15: 128–133. 1921.—Statistics of yield of forest trees growing on soils of divers geological origin indicate that no sharp demarcation exists between the yield of coniferous species, provided the aspect, altitude, and a few other factors are favorable.—*C. R. Tillotson.*

60. Munns, E. N. **Evaporation and forest fires.** Monthly Weather Rev. 49: 149–152. *Fig. 1–4.* 1921.—Hitherto, apparently, little attempt has been made by foresters and meteorologists to correlate the factors of climate and forest fires. The purpose of the present paper is to show that the occurrence and spread of large forest fires are coincident with a greatly increased rate of evaporation or a decrease in vapor pressure. Since evaporation is a climatic complex dependent on the 3 major factors of temperature, humidity, and wind, the influence of any one of these may be offset by a pronounced change in either or both of the other two. The close relation between periods of high evaporation and forest fires is strikingly brought out in figures 1 and 2, which also show that the rate of evaporation does not follow constantly either temperature, humidity, or wind. In some cases it follows wind alone, in others temperature, while in still others it follows changes in relative humidity only. In southern California the wind direction is highly important. For example, an east wind blowing directly off the great deserts brings excessively dry, hot air, resulting in extraordinary dryness in a short time. In examining the vapor pressure data for the period 1911–1920, it was found

that in those years and months in which the average vapor pressure remained high a very small number of fires occurred, while in those years and months with a relatively low average vapor pressure there were uniformly periods of extreme hazard, during which many bad fires occurred.—*E. N. Munns.*

61. Olmsted, Frederick E. **National control of forest devastation.** Jour. Forest. 19: 468–478. 1921.—The text of the new Capper Bill is given in full with an analysis of the sections and how the bill would act to control the devastation now caused by the lumber industry.—*E. N. Munns.*

62. Roig, J. T. **Legislación forestal y reservas forestales. Necesidad de una legislación forestal.** [Forestry legislation and forest reserves.] Rev. Agric. Com. y Trab. [Cuba] 3: 366–369. 1920.

63. Salt, Harold. **A tanning survey of the west.** Australian Forest. Jour. 4: 117–118. 1921.—A note is presented on the sources of supply and the possibilities of a tanning survey in studying the tannin contents of all parts of a tree.—*C. F. Korstian.*

64. Salt, Harold. **Forestry and the manufacture of tanning extracts.** Australian Forest. Jour. 4: 118–119. 1921.—The note concerns the relation of forestry to stability in the manufacture of tanning extracts.—*C. F. Korstian.*

65. Smythies, E. A., and S. H. Howard. **Taper curves and constants for sal.** Indian Forest. 47: 161–164. *2 fig.* 1921.—The taper factor for sal has been found to be a constant for all diameter classes and that for trees from 3 feet 6 inches to 6 feet 6 inches in girth the ratio

$$\frac{\text{Breast high diameter over bark}}{\text{Diameter at } x \text{ without bark}} = \text{a constant}$$

where x is any chosen height on the stem above breast height. From these points a curve may be constructed giving the taper constant which holds very close to the actual. This method may be used to determine the diameter at half height for use in volume calculations.—*E. N. Munns.*

66. Snell, Walter H. **The relation of the moisture content of wood to its decay.** Paper Trade Jour. 72[19]: 44–46. *2 fig.* 1921.—The author contributes to the discussion of the feasibility of spraying log piles for the prevention of fire, emphasizing the effect of this spraying upon decay. Muench's data are cited as well as experiments of the writer upon 5 fungi. It is shown that the moisture-decay curve varies inversely with the specific gravity of the wood. Sixty per cent of water (150 per cent calculated upon oven dry weight) prevented decay in loblolly pine sap and 67 per cent (200 per cent on oven dry weight) in Sitka spruce. Inasmuch as it has previously been shown that logs sprayed a short time contained 52–60 per cent of water, and as the pulp logs are of about the same density as the loblolly pine sap, it is concluded that spraying for fire protection carries with it no danger of favoring serious loss through decay.—*W. H. Snell.*

67. Staf, H. **Eikenhakhout.** [Oak coppice.] Tijdschr. Nederland. Heidemaatschappij 33: 215–218. 1921.—High prices for bark and the demand for fuel led to extensive planting of oak, especially on the heaths of the Velurve. Bark prices are given for the period 1874–1920. Plantations on lowlands are liable to injury by late spring frosts, and mildew frequently causes some loss. Oak can be followed by pine forests.—*J. C. Th. Uphof.*

68. Staf, H. **Het dunnen van dennenbosschen.** [Thinning of pine forests.] Tijdschr. Nederland. Heidemaatschappij 33: 158–160. 1921.

69. Stoate, T. N. **Sylvicultural notes: Pinus insignis.** Australian Forest. Jour. 3: 275–277, 325–327. 1920; 4: 9–11, 37–39, 106–107. 1921.—A silvicultural discussion is presented summarizing the information available on soil and climatic requirements, the establishment

and composition of the crop, the selection and development of the forest nursery site, seed sowing, care of seedlings, transplanting, season of planting, spacing, planting operations, planting methods, rotation, and cleanings of this important exotic species.—*C. F. Korstian.*

70. Swain, E. H. E. **Annual report of the Director of Forests for the year ended 30th June, 1920.** Ann. Progress Rept. Queensland Forest Service. *65 p.* Brisbane, 1920.—This is the usual routine report for the year. The work of the Service is summarized under the following captions: "Prospect, retrospect, financial, forest organization, logging operations, silvical investigation and experiment, forest products research, forest protection, forest survey and engineering, forest reservation, the timber market, administration, interstate and imperial conferences, personnel." Appendices include a report for the 6 months ended June 30, 1919, the Hobart Conference, the Imperial Forestry Conference, forestry in Queensland, and revenue. The duty of exploitation and of actually delivering the products of the state forests directly from the stump to the market has been added to the Forest Service.—*C. F. Korstian.*

71. Weaver, Roscoe B. **The burning of dead and down trees as a practical protection measure.** Jour. Forest. 19: 506–511. 1921.—As a protective measure, snags and down trees in western yellow pine stands in the Modoc Forest were burned during the latter part of the season. After chopping a hole in the sapwood near the base, a fire is started which burns the tree down in a short time. With recently killed trees, 2-inch auger holes are bored in the trunk at such an angle as to intersect and in one of these a fire is started which in most cases successfully drops the tree. About 2,000 acres were covered and 4,600 trees fired, averaging 115 trees per man per day at a cost of 6 cents per tree and 14 cents per acre. Such results are of great practical value as such burning can be done about areas of high fire hazard, along protection or isolation strips, along roads, and about recreation areas at a cost which makes such clearing feasible.—*E. N. Munns.*

GENETICS

George H. Shull, *Editor*

J. P. Kelly, *Assistant Editor*

(See also in this issue Entries 23, 162, 177, 182)

72. Anastasia, G. Emilio. **Le forme elementari della composizione del vegetali. L'origine della specie. (Filogenesi delle Nicotianae della Primulaceae e delle Violae. I. Le Nicotianae. [Elementary forms of the composition of plants. Origin of species. (Phylogenesis of the Nicotianae, Primulaceae, and Violae. I. The Nicotianae.]** Boll. Technico 1920[4]: *43 p., 7 pl.* 1920.—The author believes that *N. tabacum* is a composite species comprising numerous elementary forms, intermediate between species of the sections *Rustica* and *Petuniodes* of G. Don. These sections are characterized not only by flower shapes as originally described but by the shapes of the stigmas. A plant of a variety of *N. rustica* L. was crossed with pollen from a garden variety of *Petunia.* Three seeds from this cross germinated; one produced a plant which in appearance duplicated *N. tabacum.* The author is not disturbed by the possibility of error which might be suspected from the fact that the plant was completely fertile. He believes its occurrence throws much light on the origin of *N. tabacum.*—*E. M. East.*

73. Babcock, E. B. **Bud selection and the frequency of mutations.** Monthly Bull. Dept. Agric. California 10: 137–140. 1921.—The efficacy of bud selection as a means of improving the type is dependent upon the occurrence of bud mutations; its practicability, upon their frequency. In order to change existing varieties through bud selection, bud variations, or plants grown from bud variants of a relatively permanent nature, must first be discovered. Thus far data available are not sufficient to justify any conclusion regarding the practicability of increasing the yield of deciduous trees through bud selection.—*E. L. Overholser.*

74. BLAKESLEE, A. F. **The Globe mutant in the jimson weed (Datura Stramonium).** Genetics 6: 241–264. 1921.—The Globe mutant is distinguished as a seedling by its broad entire first leaves. In the first leaves of 98 Globes, length divided by breadth averaged 1.5; while in 98 normal sibs of these Globes it averaged 2.1. Globe plants have more closely overlapping and broader leaves, which are less toothed; the capsules are depressed globose, and have stouter spines. Globe seedlings are less vigorous than normals. Globes selfed gave 4403 Globes to 16,075 normals, a percentage of 21.5. Globes pollinated by normals gave 917 Globes to 2351 normals, or 28.1 per cent of Globes. Normals crossed by Globe pollen gave 57 Globes to 3362 normals, or only 1.7 per cent of Globes. Normal sibs of Globes selfed produced only 4 Globes to 2072 normals, or 0.2 per cent. In other normal lines 24 apparently original Globe mutations were found, together with 38,108 normal plants, which is a percentage of 0.06. However, one line extensively grown gave a disproportionately large number of these Globes. The other 11 mutants of *Datura* selfed gave 0.2 per cent of Globes, and when crossed by normal pollen, 0.3 per cent; while normals crossed by pollen of these mutants gave 0.1 per cent.—Nineteen normal plants gave an average of 2.7 per cent of bad pollen, while 7 Globes at the same time averaged 7.9 per cent, over 1000 grains being counted from each plant. Other extensive pollen counts gave similar results.—Selection for 10 generations failed to increase the number of Globes in the progeny.—The Globes show 12 and 13 chromosomes in the pollen mother-cells after the reduction division. It is presumed that the pollen grains with 13 chromosomes rarely function, and either that some of the 13-chromosome egg cells do not function, or that the 25-chromosome zygotes are less viable than the 24-chromosome zygotes in the early stages.—*John Belling.*

75. BLARINGHEM, L. **Sur le pollen du lin et la dégénérescence des variétés cultivées pour la fibre. [On the pollen of flax and the degeneration of varieties cultivated for fiber.]** Compt. Rend. Acad. Sci. Paris 172: 1603–1604. 1921.—The degeneration of flax is considered to be due to genetic rather than climatic influences. Hybrids between different cultivated annual flaxes and the wild biennial *L. angustifolium* are fertile but give pollen some of which is partially aborted. The large pollen grains are variable in size and shape. All the annual flaxes cultivated for grain are early-maturing, homogeneous in type, and give perfect, uniform pollen. Most of the fiber flaxes are heterogeneous in type, and their pollen is irregular or a small proportion is even aborted; these facts make it possible to suppose that these flaxes have had a remote hybrid ancestry. One strain of fiber flax of Russian origin was found to be uniform, early, well fixed in type, and to have perfect and very regular pollen. The selection of fiber flaxes based on a study of the pollen of isolated strains continued through several successive generations is recommended as a procedure for avoiding degeneration of the common varieties.—*D. F. Jones.*

76. BRIDGES, C. B. **Proof of non-disjunction for the fourth chromosome of Drosophila melanogaster.** Science 53: 308. 1921.—The author states that he secured genetic evidence of non-disjunction of the 4th chromosome in *Drosophila melanogaster* during the summer of 1920 and obtained cytological verification later the same year. He then shows that the genetic evidence recently given by LITTLE (Science 53: 167. 1921) is susceptible of interpretation as due either to the presence of a new, less extreme eyeless allelomorph, or to a dominant 4th-chromosome minus modifying factor, as well as to non-disjunction.—*H. H. Plough.*

77. BRIDGES, CALVIN B. **White ocelli—an example of a "slight" mutant character with normal viability.** Biol. Bull. 38: 231–236. 1920.—A description and genetic data of a mutation in *D. melanogaster* in which the ocelli or simple eyes are white instead of the normal brown color are given. The gene producing this effect is located in the 3rd chromosome between hairless and rough. The mutation is very slightly different from the normal, though definite and easily distinguished. It causes no diminished viability and actually persisted in mixed mass cultures for fully 175 generations without selection. Such a mutant might survive in nature, and if slightly advantageous might supplant the original type.—*H. H. Plough.*

78. Briggs, H. H. **Hereditary congenital ptosis with report of 64 cases conforming to the Mendelian rule of dominance.** Trans. Amer. Ophthalmol. Soc. 16:255–276. 1918.—The study is based on 128 persons in 6 generations, descendants of a single affected female and constituting a family of southern mountaineers. Of the entire number 64 were affected with ptosis and 64 were normal; all the former had an affected parent except 2, and in these cases the evidence concerning the parent is not conclusive. The author discusses the Mendelian law of inheritance and considers that his "cases conform to the Mendelian law of dominance." The paper is illustrated with portraits and a pedigree chart; a review of the literature on the subject and a bibliography of 45 numbers are added.—*Howard J. Banker.*

79. Briggs, H. H. **Hereditary congenital ptosis with report of 64 cases conforming to the Mendelian rule of dominance.** Amer. Jour. Ophthalmol. III, 2: 408–417. 1919.—The paper published in Trans. Amer. Ophthalmol. Soc. 16: 255–276. 1918 (see preceding entry) is here printed in "slightly abridged" form without portraits.—*Howard J. Banker.*

80. Caron, von. **Die Erfolge der Verwandtschafts- und Inzucht bei den Eldinger Weizenzüchtungen. [The results of consanguine breeding and of inbreeding in the Eldingen wheat breeding.]** Deutsch. Landw. Presse 1920: 390–391. 1920.—The author describes briefly his methods in developing strains of wheat with high gluten content, immunity to rust, and other desirable characters. He began with a wide cross and followed this with selection among self-fertilized lines and later with crosses among these lines.—*Sewall Wright.*

81. Carothers, E. Eleanor. **Genetical behavior of heteromorphic homologous chromosomes of Circotettix (Orthoptera).** Jour. Morphol. 35: 457–483. *5 pl.* 1921.—Both males and females of *Circotettix* were collected from the wild; only nymphs of the females were used. Eighteen matings were made. In 6 of these one or the other parent died, and in the remaining 12 only 8 produced offspring. After the eggs had been laid both parents were killed, and the gonads were fixed and sectioned. Twenty-eight male offspring were studied cytologically.—In *C. verruculatus* the spermatogonial complex consists of 21 chromosomes, 9 large atelomitic, 6 telomitic, and the other 6 may be either telomitic or atelomitic, but constant for an individual. The complex for the female is similar except that there is an additional accessory which gives constantly 10 large atelomitic chromosomes. In the spermatocyte 4 chromosomes and the accessory are atelomitic, 3 are constantly telomitic, and 3 may vary from specimen to specimen. The 28 males which were studied were the offspring of 5 crosses in which the chromosomal complexes of the parents are known. No offspring varied in its chromosomal constitution beyond the limits to be expected from a combination of the gametes of its parents. These homologues have been actually identified in both parents and offspring.—*Mary T. Harman.*

82. Correns, C. **Versuche bei Pflanzen das Geschlechtsverhältnis zu verschieben. [Attempts to modify the sex ratio in plants.]** Hereditas 2: 1–24. *5 fig.* 1921.—The present theory of the mechanism of sex determination is explained in detail and the evidence briefly summarized. Examples of modified sex ratios in several species are pointed out. The paper deals particularly with the author's experiments in the genus *Melandrium.* This is a dioecious plant which has been found by various investigators to produce approximately 44 per cent male and 56 per cent female plants. By applying pollen in different amounts it was possible to modify the ratio even more. When an overabundance of pollen was used the number of females in the progeny increased 12 per cent over that in the progeny from plants on which but a small amount of pollen had been applied. The proportion of males to females was also changed by cutting off the style soon after pollination and before all the pollen tubes had reached the ovules. In 1 case the progeny of a plant so treated produced 69 per cent female and 31 per cent male plants. Both of these experiments indicate that the female-producing pollen grains have a more vigorous pollen tube or in some other way effect a more rapid fertilization of the ovules. By careful drying it was possible to keep alive the pollen of *Melandrium* for 120 days. When old pollen was applied the resulting progeny showed a decrease in the percentage of female plants; this decrease became more pronounced with increasing age of the

pollen. When very old pollen was used no female plants were produced. However, the plants were so few,—due to the large number of undeveloped seeds,—that the results are not entirely significant. The author concludes that in nature the factors tending to influence the sex ratio in one direction are, as a rule, equal to those acting in the opposite direction so that the net result is approximately a 1:1 ratio. This ratio may in some cases be modified by artificial means.—*P. C. Mangelsdorf.*

83. CZAJA, A. TH. [German Rev. of: CHAMBERLAIN, CHARLES J. **Grouping and mutation in Botrychium.** Bot. Gaz. 70: 387–398. *11 fig.* 1920 (see Bot. Absts. 7, Entry 1735).] Zeitschr. Bot. 13: 472–473. 1921.

84. DORSEY, M. J. **Some characteristics of open-pollinated seedlings of the Malinda apple.** Proc. Amer. Soc. Hort. Sci. 16: 36–42. 1919 [1920].—A large number of seedlings from open-pollinated fruit of the Malinda apple were planted and studied for the following characters: Resistance to cold, age of bearing, and characters of the fruit. Standing in close proximity to the Malinda apple were such varieties as Oldenburg, Wealthy, Scott Winter, Hibernal, Pattens Greening, Northwestern Greening, and a number of other varieties. The Malinda seed was selected especially for the hardiness of the tree and the long-keeping quality of its fruit.—During selection a large number of seedlings were discarded as inferior or unworthy. Of the 3879 original seedlings 49.1 per cent were removed because of their wild-type or stunted growth, 20.8 per cent were discarded because of inferior fruit, and 30.1 per cent were selected for further study. Two-thirds of these selected trees were retained because of their superior fruit and the remaining ⅓ because they had not come into bearing; girdling processes failed to hasten the period of fruit-bearing. The author points out that while all of the seedlings originated from the same known tree a great variation in the age at which they come into bearing is found among them. The question is raised as to whether the early-bearing habit of seedlings will be transmitted to orchard trees when propagated from them by vegetative means.—Among the pronounced variations found in the seedlings were extreme cases in sweetness and acidity of fruit, keeping quality, and resistance to cold.—From the material studied the author concludes that the named varieties of apples are only rare or extreme variations within the species, and that unless certain varieties vary in the proportion of inferior types in the progeny, these open-pollinated seedlings give a fair index as to the expectations in the F_1 of inter-varietal combinations.—*L. R. Detjen.*

85. DYKES, W. R. **Irises of the future.** Gard. Chron. 69: 258. 1921.—Notes are given on a considerable number of *Iris* species, with comments on their behavior when crossed, or suggestions as to the probable results of crossing. "*Iris pseudacorus* seems to reproduce itself with whatever pollen the flowers are fertilized, and nothing seems able to fertilize *I. foetidissima* except its own pollen."—*J. Marion Shull.*

86. EYSTER, W. H. **The linkage relations between the factors for tunicate ear and starchy sugary endosperm in maize.** Genetics 6: 209–240. 1921.—A study of the linkage relations of the tunicate or podded-ear character with 30 other mutant factors of maize is reported. The only linkage found was with the sugary endosperm of the seeds, confirming the observations of JONES and GALLASTEGUI; but where these authors found 8 per cent of crossing over between the tunicate and sugary factors the author finds 27 per cent in the megasporocytes and 35 per cent in the microsporocytes. In the test with the ramose character of the inflorescence the results confirm the observations of COLLINS and the author concludes with him that homozygous tunicate plants are sterile.—*J. H. Kempton.*

87. FRATEUR, J. L. **La nature héréditaire du pelage sauvage du lapin.** [**The heredity of the wild coat pattern of the rabbit.**] *11 p.* Imprimerie G. Bothy: Ixelles Bruxelles, 1920.—The author gives a minute description of the coat color of the wild rabbit and its minor variations. He believes that this pattern is complex genetically as well as somatically. He finds certain elements of it apparently dissociated from others, in the black-and-tan pattern. His crosses indicate that black-and-tan differs from black by a dominant unit factor and he assumes that

the wild pattern involves a 2nd dominant factor. He is therefore surprised to find that he obtains merely monohybrid ratios in crosses of wild with either black, or black-and-tan; this he explains by selective fertilization. As to minor variations of the wild pattern, the author finds that a dark under color on the belly is dominant over pure white and gives monohybrid ratios in back-crosses and F_2.—*Sewall Wright.*

88. FRUWIRTH, C. **Zu "Wicke mit linsenförmigem Samen."** [To "Vetches with lens-shaped seeds."] Zeitschr. Pflanzenzücht. 8: 89. 1921.—Quotations are given from an original article by F. A. WIEGMANN, "Über die Bastarderzeugung im Pflanzenreiche," Vieweg, 1828.—Wiegmann planted vetch and lentils together and saved seeds from each separately. Seeds from the vetch parent produced plants which were similar to the mother plant but bore flat, compressed seeds of paler color; hence, resembling the lentil seeds. These plants appeared to breed true for their hybrid characters.—*C. M. Woodworth.*

89. FUNKQUIST, H. **The inheritance of the muzzle color in the cattle breed of Stjernsund.** Hereditas 1: 343–363. 1920.—Inbreeding has been followed in this breed for 30 years and the animals are therefore closely related. The muzzles are light- and dark-colored; the former are termed flesh-colored and the latter black, lead, or slate-colored. Those that are spotted or slightly pigmented are termed mixed.—The study is largely made from the descendants of 11 bulls. Tables for each of these bulls are given, showing the muzzle color of each descendant and that of the dam of each descendant. Of the 11 sires used, 6 were pigmented, 3 mixed, and 2 flesh-colored. The matings of these 6 pigmented sires gave the following results: When mated with pigmented dams, 225 pigmented, 48 mixed, and 11 flesh-colored; when mated with mixed dams, 45 pigmented, 44 mixed, and 18 flesh-colored; when mated with flesh-colored dams, 79 pigmented, 64 mixed, and 46 flesh-colored.—The mating of the 3 mixed sires gave the following results: When mated with pigmented dams, 51 pigmented, 13 mixed, and 6 flesh-colored; when mated with mixed dams, 16 pigmented, 18 mixed, and 16 flesh-colored; when mated with flesh-colored dams, 9 pigmented, 9 mixed, and 16 flesh-colored.—The matings of the 2 flesh-colored bulls gave the following results: When mated with pigmented dams, 18 pigmented, 16 mixed, and 11 flesh-colored; when mated with mixed dams, 3 pigmented, 4 mixed, and 7 flesh-colored; when mated with flesh-colored dams, 5 pigmented, 10 mixed, and 10 flesh-colored.—It is believed that the following 2 hypotheses explain the inheritance of muzzle color: 1. There is an inhibiting factor preventing the intensity factors from acting. The flesh-colored muzzle is due to the presence of this inhibiting factor or to the absence of the intensity factors. 2. There is a yellow pigment factor epistatic to the intensity factors producing dark pigment. The flesh-colored muzzle is due to the presence of this yellow pigment factor or to the absence of the intensity factors.—*R. R. Graves.*

90. GOWEN, J. W. **The variation of milk secretion with age in Jersey cattle.** Maine Agric. Exp. Sta. Bull. 286. *49–60.* 1920.—From a study of 1741 8-months milk records, it was found that yield of milk changed definitely with age and that this change was logarithmic and not linear. If growth of the mammary gland is a logarithmic function of age a causal relation may exist between this and yield of milk, due to an increase in the number of cells rather than to an increase in the ability of cells to secrete milk.—*E. Roberts.*

91. GUINIER, PH. **Variations de sexualité dioicité et dimorphisme sexuel chez le Pinus montana Mill. et le P. sylvestris L.** [Variations in sexuality, dioeciousness, and sexual dimorphism in Pinus montana and P. sylvestris L.] Compt. Rend. Soc. Biol. 84: 94–96. 1921.—*Pinus montana* Mill. and *P. sylvestris* L., normally monoecious, were found to show a tendency toward dioeciousness associated with the development of the trees. The production of fertile pistillate branches is dependent upon vigorous vegetative growth, without which only fertile staminate branches are produced. Young trees tend to function as females while older trees become male-functioning only, as do also trees which have been grown under unfavorable conditions.—*D. F. Jones.*

92. HAECKER, VALENTIN. **Allgemeine Vererbunsglehre. [General genetics.]** *16 × 24 cm., ix + 444 p., 149 fig.* Friedr. Vieweg & Sohn: Braunschweig, 1921.—The book consists of 37 chapters arranged in 7 sections. The contents of these 7 sections, together with the author's views of chief theoretical interest, are briefly as follows: Section I. Early known facts of heredity in man and domestic animals and the development of ideas of heredity are reviewed. The author gives (1) the early classification of facts of heredity by means of so-called "laws"; (2) statistical laws, as those of ancestral contributions, regression (GALTON); (3) development of statistical methods; and (4) origin and methods of genealogy.—Section II is devoted to (1) morphological basis of heredity; (2) structure, chemistry, and physiology of protoplasm; (3) cell theory and structure of nucleus. The division of organisms into cells is held to be significant in the development of form and in physiological processes. Several theories of the mechanics of cell division are discussed without special support of any one. Somatic and germ cells are recognized early in embryonic development. Maturation and structure of mature germ cells, attraction of egg and sperm, and the process of fertilization are described. Complete or partial separation of egg chromosomes and sperm chromosomes (gonomery) in early spindles or nuclei of the embryo is described in several cases. The history of germ cells in plants is briefly related. Size differences among chromosomes may be due in some cases, at least, to unequal growth of the chromosomes. The number of chromosomes is given for many species, and the variation in number within single species and among species of larger groups is described. Diminution in the size of chromosomes in evolution appears to occur simultaneously with a decrease in number. Maturation divisions in animals are homologized with those in plants. Maturation is regarded phylogenetically as rudimentary spore formation.—Section III. Older morphological theories of heredity (DARWIN's pangenesis, GALTON's stirps, etc.) are discussed. Continuity of germ-plasm is regarded by the author as forming the foundation of the theory of heredity. The mechanistic theories of NÄGELI, ROUX, WEISMANN, and others are described. The contrast between nucleus and cytoplasm as agents in heredity has been over-emphasized for in general the action of the 2 is harmonious. Though it is conceivable that somatic induction may impress changes upon germ cells following somatic modification, it is scarcely possible that the chain of events would be reversed and produce the same somatic modification in the offspring. The medical practice of calling diseases hereditary when they are merely congenital, owing to germinal or intra-uterine infection, is criticized. Satisfactory evidence of the inheritance of injuries, functional changes, and psychic acquisitions has never been produced; but practical breeders and some others believe in such inheritance. An explanation of supposed inheritance of acquired characters by parallel induction, especially indirect parallel induction (through sense organs and the nervous system), is given with implied approval. Parallel activation, calling into action certain ones of a limited number of capacities in the parent and offspring, may be the explanation of some cases. Parallel reduction, loss of certain characteristics through general chemical change in both parent and offspring, is suggested to explain some cases. Similar modifications of parent and offspring may also easily arise owing to general weakening through poisons (germinal injury, blastophthoria). New hereditary factors have been produced (TOWER's beetles) by direct environmental action on germ cells. Besides offering the usual explanation for xenia and certain bizarre phenomena, the author suggests that in some cases these phenomena may be the result of hormone (?) action of the male elements. Graft hybrids are described. Weismann's system of idants, ids, determinants, and biophores is discussed in relation to maturation, amphimixis, and embryonic development, with brief comment in view of more recently discovered phenomena. Weismann's theory is regarded as neo-preformationist, in contrast to those of O. HERTWIG and others which are neo-epigenetic.—Section IV. The development of pre-Mendelian ideas of heredity, terminology, classification of hybrids, and sterility are discussed. MENDEL's law is separated into 3 parts: Law of uniformity in F_1, law of segregation, and law of independent assortment; the widespread application of these laws is demonstrated by numerous examples. Presence and absence hypothesis is accepted in explanations. Multiple allelomorphs, such as factors for gray, black, and chocolate in mice, are defined as 2 or more factors which represent different grades of the same character. Cases of polymery are discussed. Inheritance of sex, sex-

linked inheritance, and intersexuality are explained. Sex determination takes place either before, at, or after fertilization. Exceptions to Mendel's laws are found in reversible dominance, fluctuation of unit characters, and irregular ratios; these have been explained by auxiliary hypotheses, such as inhibiting factors, linkage, repulsion, reduplication, differential mortality, incompatibility, etc. The Mendelian theory is in harmony with the corpuscular theory of Weismann, mutation theory, genotype theory, and evolution and selection theory. The author thinks it probable that continuous variation of germ-plasm occurs under the effect of environment and selection; in unicellular organisms it always results in visibly continuous variations, while in multicellular ones the results may appear as discontinuous variations.—Section V. Many characters are shown to depend on physiological features of embryonic development; complexly determined characters are more likely to exhibit impure segregation than simple ones; difference is attributed to ferments; characters complex in development are more likely to be of selective value. Extreme cases of complex causation may be highly species-specialized; intermediate cases are species-forming characters. Characters found in many species are usually simple in development and inheritance. Simple characters in man persist in hybrid races, complex ones tend to disappear. The inheritance of numerous human traits is described.—Section VI. Individuality of chromosomes is no longer to be regarded as a working hypothesis, but as a well-grounded theory. The author doubts the correctness of the theory of parasynapsis and splitting of chromosomes as accounting for formation of tetrads, holding that these phenomena may be partly due to accident, and partly to artifact; but he recognizes that Mendelian heredity is better explained by that theory than by telosynapsis. The Sutton-Boveri chromosome theory of heredity is outlined. The chromosome theory of sex is considered almost universally accepted. Some form of quantitative theory fits the facts better than the hypothesis that there are specific genes for sex as for other characters; but both theories are objectionable. The author believes that X chromosomes are mere indices, not causes; the relation of metabolism to sex supports the index-hypothesis. Proof of Morgan's theories of linear arrangement and crossing over await discoveries in forms in addition to *Drosophila*. Purity of gametes is proved, but that segregation is effected by reduction division is still in doubt; there is much evidence of somatic segregation. The author suggests the nucleoplasma theory to account for unequal cell divisions, including segregation of genes. Materials passing from the nucleus to the cytoplasm, or produced in the cytoplasm under the influences of the nucleus, may be equally divided at cell division, or may be sorted out (segregated); these substances may in turn influence the nature of the nucleus. Quantitative relations are supposed to determine dominance.—Final Section. Though a knowledge of Mendelian phenomena has led to few striking improvements in domesticated animals, it has made intelligible many puzzling phenomena, such as instability of certain species, atavism, individual potency, effects of inbreeding, heterosis, limits of artificial selection, and correlation, and has been useful in anthropology.—*A. Franklin Shull.*

93. Harlan, H. V., and S. Anthony. **Development of barley kernels in normal and clipped spikes and the limitations of awnless and hooded varieties.** Jour. Agric. Res. 19: 431–472. 1920.—Removal of awns at flowering time results in (1) a lessened deposit of dry matter in the kernel, especially of starch; and (2) an increased deposit of ash in the rachis of the spike. The awn functions as a depository for ash and its removal causes the surplus ash to accumulate in the rachis. This ash accumulation causes brittleness of the spike and consequent tendency to shatter. Hooded and awnless sorts have rachises more brittle than armed sorts, also yield less grain. The production of high-yielding strains of these types may be possible by using parents having a low percentage of ash in the rachises.—The substitution of smooth for scabrous armed sorts is suggested as likely to meet the objections of growers and feeders of barley. The production of such sorts equal in yield to the latter is a future task of the plant breeder.—*F. P. Bussell.*

94. Harrison, J. W. Heslop. **The variation of Primula farinosa L. in County Durham.** Vasculum 7: 21–25. 1921.—Variations are described in *P. farinosa* found in the mountains and along the Durham coast. Many of the variations are similar to those attributed to hybridization. The isolation of desirable types is attributed to the isolation of factors hitherto latent.—*Karl Sax.*

95. HAVILAND, MAUD D. Preliminary note on antennal variation in an Aphis (Myzus ribis Linn.). Proc. Cambridge Phil. Soc. 20: 35–44. 1920.—The author reports that within a single clone of *Myzus ribis* ratios of certain antennal lengths to head breadth decreased with feeding on red-blistered leaves and increased with feeding on green unblistered leaves. Transference of red-fed individuals to green food indicated persistence of the effects of red food for 2 or 3 generations.—*J. P. Kelly.*

96. HEIN, S. A. ARENDSEN. Studies on variation in the meal-worm, Tenebrio molitor. I. Biological and genetical notes on Tenebrio molitor. Jour. Genetics 10: 227–264. *16 fig.* 1920.—*Tenebrio molitor* is a common beetle belonging to the series Heteromera, in which the 1st and 2nd pairs of legs have 5 joints to the toes but the 3rd pair only 4. As there are over 15,000 species of Heteromera, this character may be considered to have remained fixed for millions of years. Nevertheless, on examining 35,247 individuals of *T. molitor*, no less than 60 were found with 5 joints in the posterior toes. Breeding from these gave only negative results, the character apparently being not inherited; but on the other hand, when beetles, with fewer joints in the toes than normal, were bred together, the character was found to be inherited. Variations in the color of the eyes were found; the normal eye is intense black. Cream-white eyes show sex-limited descent; red eyes are apparently not sex-limited. The larvae show variations in color and structure, which were studied. Numerous details are given concerning the life-history and characters of the species.—*T. D. A. Cockerell.*

97. JACKSON, HARTLEY H. T. A hybrid deer of the F_2 generation. Jour. Mammalogy 2: 140–143. *1 pl., 1 fig.* 1921.—On the eastern slopes of the Cascade Mountains in the State of Washington there is a limited area in which the ranges of the mule deer, *Odocoileus hemionus hemionus*, and the Columbian black-tailed deer, *O. columbianus columbianus*, overlap. In the wild state these 2 species have been known to hybridize, but the F_2 individual reported was bred in captivity. The F_1 sire of this specimen (now No. 223,685 U. S. National Museum, Biological Survey Collection) was sired by a full-blooded mule deer out of a black-tailed doe. The F_1 dam was sired by a full-blooded black-tail buck out of a mule doe. Each of these individuals was born and raised in captivity. Nevertheless, there were no data available on the traits of the parental generation or the F_1 parents, so a comparison with the 2 pure species in general was all that was possible. The author draws 2 conclusions: (1) The F_1 hybrids are fertile among themselves despite widespread recognition of the parents as distinct species; (2) certain unit characters are transmitted to the offspring in addition to characters that are apparently intermediate in nature. The F_2 individual was essentially a mule deer in shape and size of horn, in shape of the post-orbital region of the skull, in the size of the metatarsal glands, and in the general body size. It showed the black-tailed character of *O. columbianus columbianus*, however.—*Edward N. Wentworth.*

98. JEFFREY, E. C. The geographical distribution of hybrids. Science 53: 556. 1921.—The author objects to criticisms directed against BRAINERD and PEITERSEN (see Bot. Absts. 8, Entry 233) for classifying as hybrids blackberry (*Rubus*) forms which occur outside the range of the supposed parents. Instances are cited from KERNER in support of the contention "that absence of one or both parent species of a supposed hybrid in a given region is no valid argument against the hybrid origin of such an intermediate form."—*R. E. Clausen.*

99. JONES, L. R., J. C. WALKER, AND W. B. TISDALE. Fusarium resistant cabbage. Wisconsin Agric. Exp. Sta. Res. Bull. 48. *34 p., 10 fig.* 1920.—Cabbage yellows, widespread in the eastern U. S. A., is caused by the fungus *Fusarium conglutinans* Wollenw. The fungus penetrates the root hairs, pushing through the cortical tissues until it reaches the vascular system. This leads to the death of the vascular tissues followed by a slow yellowing of the aerial parts. Soil remains infected almost indefinitely. The destructiveness of the disease depends on seasonal conditions as aggressive host invasion occurs only at relatively high temperatures, 17°C. and above.—As a result of careful selection experiments the conclusion was reached that resistance is due to heritable differences (multiple factors) and that by selection of resistant heads from "sick" soil a *Fusarium*-resistant strain may be secured. Disease

resistance does not seem to be incompatible with any other of the commonly recognized cabbage characters.—The method which has proved most desirable is the selection of resistant plants; the growing of resistant heads in isolation, and the obtaining of self-fertilized seed; and mass selection from those cultures which show the greatest degree of resistance. Strains produced by this method have been distributed, and have proved resistant in other states.—*H. K. Hayes.*

100. JORDAN, DAVID STARR. **The inbred descendants of Charlemagne: a glance at the scientific side of genealogy.** Sci. Monthly 13: 481–492. 1921.—A chart of American genealogy from the 12th century to the present and showing the lines of descent of hundreds of well known families, by Miss Sarah Louise Kimball, of Palo Alto, California, furnishes the basis for the author's discussion. This chart is only a fragment of the genealogy of a single person. By calculating the descendants and comparing with the population, it becomes evident that the intervening individuals are reckoned over and over again. The tangled lineage of the English people gives a clue to the origin and persistence of racial traits. The law of primogeniture led to noble and peasant of the same blood. The ancestral record of George Washington, Abraham Lincoln, George V, Grover Cleveland, Theodore Roosevelt, Robert Edward Lee, and others, is given, showing that for over 200 years the line is identical.—*L. Pace.*

101. KLATT, BERTHOLD. **Beiträge zur Sexualphysiologie des Schwammspinners. [Contributions to the sexual physiology of the gypsy moth.]** Biol. Zentralbl. 40: 539–558. 1920.—Results of a study of oviposition are reported. The female genitalia and the process of copulation are described in detail; oviposition takes place in the dark only. Normal mated females lay eggs in a solid mass covered with wool and cemented together. Unmated females, after prolonged delay, produce a few scattered eggs and die with egg-filled abdomens. Normal females mated with completely castrated males or normal males when ejaculation has been prevented produce a few scattered eggs,—rudimentary oviposition. Matings of normal females with males castrated as caterpillars, and therefore still possessing accessory glands, produce rudimentary oviposition although such males produce a small spermatophore lacking sperm. Successive matings of a normal female with a number of incompletely castrated males produce rudimentary oviposition. Completely castrated females and others in which the connection between the ovary and oviduct is broken show normal desire for copulation and normal activities of oviposition—"oviposition without eggs." Castrated females mated with castrated males show the activities of rudimentary oviposition. The author concludes that the presence of eggs is not essential to the normal activities of females. Darkness plus tactile stimulus of the penis are sufficient to produce rudimentary oviposition. Darkness plus tactile stimulus and the presence of sperm in motion are necessary for normal oviposition.—*P. W. Whiting.*

102. KRÜGER, PAUL. **Studien an Cirripedien. [Studies on Cirripedes.]** Zeitschr. Indukt. Abstamm- u. Vererb. 24: 105–158. *13 fig.* 1920.—Sex conditions in barnacles are compared with those in plants; for example, relations in the genus *Ibla* are compared with CORRENS' studies of *Bryonia.* The occurrence of hermaphroditism, dioecism, trioecism, androdioecism, gynodioecism, and parthenogenesis in various groups of barnacles is discussed from the point of view of Mendelian heredity, cytology, and phylogeny. A brief review of sex conditions is given for other groups, especially mollusks. The problem of sex-determination may be attacked by crossing hermaphroditic and dioecious species for example, by studying sex-linkage, or by cytological investigation of gametogenesis. A special study of the androdioecious species, *Scalpellum scalpellum,* was made at Kristineberg, Sweden; the study included the morphology and distribution of developmental stages and cytological conditions, especially in relation to chromosomes. Three forms of gametogenesis,—ovogenesis and spermatogenesis of the hermaphrodite, and spermatogenesis of the male,—show no significant differences. The diploid number of chromosomes is always 32, with reduction to 16 in the 1st and 2nd gametocytes. The chromosomes of metaphase are compact and almost similar, in form and size; no heterochromosomes occur so that the results are inconclusive as regards the sex problem.—*P. W. Whiting.*

103. LENZ, F. **Kann eine quantitative Fluktuation von Erbfactoren von wesentlicher Bedeutung für Artbildung sein? [Can a quantitative fluctuation of genes be of significance for species formation?]** Zeitschr. Indukt. Abstamm.- u. Vererb. 25: 169–175. 1921.—This paper consists of a critical discussion of GOLDSCHMIDT's theory that evolution proceeds mainly through the accumulation of fluctuations in the genes, rather than through mutation and the recombination of genes. The theory goes further, explaining that genes are purely chemical in nature, each one being an enzyme, whose quantitative fluctuations are expressed in the soma. The obvious difficulties for such a chemical theory are indicated: In order to explain any stability or continuity in a sea of fluctuations, it becomes necessary to assume some limiting structure which then becomes the controlling basis of the continuity as well as of the fluctuations. This is shown to be the case when Goldschmidt assumes the chromosomes to be colloidal skeletons which absorb the inheritance-enzymes at cell division, and form the mechanism for their equal division between the daughter cells. Aside from this difficulty, Goldschmidt's theory offers no explanation for the development of new genes (enzymes). Further difficulties are mentioned, such as the failure to distinguish between inherited variations and those that are only somatic; and objections are made to various specific statements of Goldschmidt.—*E. C. MacDowell.*

104. LITTLE, C. C., AND M. GIBBONS. **Evidence for sex-linked lethal factors in man.** Proc. Soc. Exp. Biol. Med. 18: 111–115. 1921.—After illustrating the inheritance of the lethal factor in yellow mice and sex-linked inheritance in the tortoise-shell cat, the authors show the manner of inheritance of haemophilia and color blindness in the human race. They then demonstrate that any sex-linked lethal factors in man would follow the same line of inheritance, and examine the data of BULLOCH and FILDES on haemophilia as well as the data of the Eugenics Record Office. If sex-linked lethal factors are linked to the allelomorph for normal in the case of haemophilia and color blindness each, there should be an excess of abnormal types among the males as compared with the normal types, and there should also be a decreased proportion of females in families having no excess of affected males. The following table shows the results:

	SEX RATIO		RATIO MALES TO 100 FEMALES	DIFFERENCE
	Males	Females		
All males haemophilic	413	337	122.55 ± 2.73	35.26 ± 3.39
Part males haemophilic	1070	678	157.81 ± 2.02	10.4 × P. E.
All males color blind	114	100	114.00 ± 4.4	30.62 ± 6.52
Part males color blind	184	119	154.62 ± 4.83	4.6 × P. E.

The excess of haemophilics is so great as compared to the number expected that the odds exceed 1 to a billion that chance is the cause. Similarly, the odds that the excess in the case of color blindness is due to chance are 26 to 1. In the case of deficiency in the females, the odds are 1 to 2 billion in the case of haemophilia and 1 to over 500 in the case of color blindness.—*Edward N. Wentworth.*

105. LÖNNBERG, EINAR. **Hybrid gulls.** Arkiv Zool. 12: 1–22. *3 pl., 6 fig.* 1919.—A number of hybrids from (1) *Larus leucopterus* ♀ × *L. fuscus* ♂ and (2) *L. glaucus* ♀ × *L. marinus* ♂ are described in detail; many of these birds were bred in confinement. The pinkish feet of (♀) *leucopterus* were dominant over yellow feet of (♂) *fuscus;* black pigment in the primaries of *fuscus* is dominant over absence of the corresponding pigment of *leucopterus.* The white on the primaries was variable in the hybrids. The parent species are believed to represent extreme stages of development in opposite directions; the hybrid is intermediate, and is interpreted as more primitive or generalized,—in other words, it is considered "a reversion to an ancestral form."—The hybrid between *L. marinus* and *L. glaucus* is taken to be

the same as the form which has been described and named *L. nelsoni* Henshaw.—Both sets of hybrids in the juvenile stage more closely resemble the darker parent.—*L. J. Cole.*

106. McRostie, G. P. **The immunization of plants.** Sci. Agric. [Canada] 1: 122–124. 1921.—The present paper, read before the Quebec Society for the Protection of Plants, discusses the general ideas of selection and hybridization to secure disease-resistant plants.—*B. T. Dickson.*

107. Malone, J. Y. **Spermatogenesis of the dog.** Trans. Amer. Microsc. Soc. 37: 97–110. *2 pl.* 1918.—The spermatogonia show 21 chromosomes. The leptotene thread apparently undergoes parasynapsis. The X chromosome stands apart as a compact dark-staining mass. Ten bivalent and an X chromosome appear in the metaphase of the primary spermatocyte. The X chromosome passes undivided to one pole. The secondary spermatocytes show 10 and 11 chromosomes, respectively. In spermiogenesis the centrosome gives rise to the end-knob, axial filament, and the posterior centrosome; the sphere substance to the acrosome; and the spermatosphere to the sheath of the middle piece. Measurements of mature spermatozoa show a bimodal curve.—*M. F. Guyer.*

108. Morgan, T. H., A. H. Sturtevant, and C. B. Bridges. **The evidence for the linear order of the genes.** Proc. Nation. Acad. Sci. [U. S.] 6: 162–164. 1920.—This paper is the final answer to the criticisms of Castle of the theory of the linear order of the genes in the chromosome, and to his suggested 3-dimensional chromosome model. The authors emphasize the proof already cited that the linear order is shown by building up the whole chromosome by combining "distances" so short that no double-crossover classes appear. "The purpose of the chromosome maps is two-fold: 1st, to give the sequence of the loci, and 2nd, to indicate by the relative spacing of the loci the crossover values most likely to coincide with the results of future experiments." In order to discover the 1st point it is necessary to use data in which all loci however widely separated are followed in a single experiment, while the latter point can be determined best by the use of all available data including intermediate points. It has already been shown why the two do not necessarily correspond, yet Castle states that the authors reject "nearly 99 per cent" of their data in the case of the yellow, bifid section of the map, and reverse the method in constructing their model. It is also stated that there is nothing impossible in crossing over in excess of 50 per cent. The authors believe that all of Castle's objections have been met, and that his 3-dimensional scheme does not fit the data.—*H. H. Plough.*

109. Muller, H. J. **Are the factors of heredity arranged in a line?** Amer. Nat. 54: 97–121. *4 fig.* 1920.—The author shows that Castle's objections to the linear arrangement of genes in chromosomes, and his substitute non-linear 3-dimensional models are invalid, since they involve, among others, the following gratuitous or erroneous assumptions: (1) Shapes and sizes of organic molecules; (2) that double or triple crossover does not occur; (3) that data from unrelated experiments are comparable; (4) that both small and large frequencies of separation can be represented by straight lines in some single consistent model; (5) that proportionate representation of separation frequencies is compatible with polarized breaks in linkage; (6) that map-distances greater than 50 units must connote separation frequencies greater than 50 per cent; and (7) that coincidence can be left unconsidered. It is shown that, mathematically considered, genes are arranged in a bipolar fashion, each linked directly to only 2 others, those lying to the right and to the left in a line all parts of which are straight,—a relation that, physically considered, requires a material connection of gene to gene in chain formation.—*Calvin B. Bridges.*

110. Nachtsheim. [German rev. of: Metz, C. W. **Chromosome studies in the Diptera. I. A preliminary survey of five different types of chromosome groups in the genus Drosophila.** Jour. Exp. Zool. 17: 45–56. *26 fig.* 1914. Idem. **II. The paired association of chromosomes in the Diptera and its significance.** Jour. Exp. Zool. 21: 213–262. *8 pl.* 1916. Idem. **III. Additional types of chromosome groups in the Drosophilidae.** Amer. Nat. 50: 587–599. 1916.] Arch. Zellforsch. 15: 310–312. 1920.

111. Noack, Konrad Ludwig. [German rev. of: Correns, C. **Vererbungsversuche mit buntblättrigen Sippen. III. Veronica gentianoides albocincta. IV. Die albomarmorata- und albopulverea-Sippen. V. Mercurialis annua versicolor und xantha. [Genetical studies with variegated races. III. Veronica gentianoides albocincta. IV. The albomarmorata and albopulverea races. V. Mercurialis annua versicolor and xantha.]** Sitzungsber. Preuss. Akad. Wiss. Berlin 1920: 212–240. 1920 (see Bot. Absts. 8, Entry 1068).] Zeitschr. Bot. 13: 465–467. 1921.

112. Ohshima, Hiroshi. **Reversal of asymmetry in the plutei of Echinus miliaris.** Proc. Roy. Soc. London B. 92: 168–178. *2 fig.* 1921.—The author discusses experiences in rearing larvae of echinoids, among which, in a small proportion of cases, the hydrocoele cavity developed upon the right side instead of the left, as normally is the case. In such individuals the larval symmetry throughout became reversed, though the fully developed echinoid showed no evident departures from the normal condition. In some cases larvae were found having hydrocoeles upon both sides. The paper is largely devoted to a discussion of hypotheses to explain these conditions, the one advocated being that the exceptional right-handed condition is due to the early suppression of the left hydrocoele through accident (external causes). The double condition results from a temporary or partial suppression of the left hydrocoele. A 2nd generation was not obtained, but the author's discussion implies that the character is believed to be non-hereditary.—*F. B. Sumner.*

113. Pearl, R., J. W. Gowen, and J. R. Miner. **Studies in milk secretion. VII. Transmitting qualities of Jersey sires for milk yield, butter fat percentage, and butter fat.** Maine Agric. Exp. Sta. Bull. 281. 89–164, 165–204. 1919.—The aims of this investigation as set forth by the authors are: (1) To determine the transmitting qualities of Jersey Register of Merit Sires for milk production and (2) butterfat percentage. (3) To determine the net change in yearly production of butterfat between the daughter's production and mother's production for Jersey Registry Sires. (4) To determine the transmitting qualities of the sire's sire as judged by the production of the daughters of his son in comparison with that of their dams. (5) To analyze the pedigree of the superior and inferior sires of the Jersey breed. As material the records for the year test of Jersey cows contained in volumes 1–5 of the Register of Merit were used.—All bulls having 2 or more daughters with year records from dams with year records were included. All milk records were calculated to a standard age of 8 years and all fat percentages to the age of 2 years, making all records comparable. The dams are divided into 4 classes in order to make allowance for the difference in their ability as producers.—Three tables are given in which the 224 bulls studied are ranked according to the average amount of increase of milk, per cent of fat and amount of butterfat of daughters over dams. The summary shows that 105 bulls raised the milk production, 101 raised the fat percentage, and 99 increased the amount of butterfat of daughters over dams.—Pedigree studies of the leading bulls are included, and a comparison is also made with the lists of leading native and imported sires selected by a well known breeder.—Lists of bulls are given which increased and decreased the milk and butterfat percentage of their daughters. This is followed by a thorough study of the ancestry of these superior and inferior transmitting sires to determine their inbreeding and relationship, and the amount of Island and American stock in the male and female sides of the pedigree. There are 28 superior and 47 inferior sires in the group studied and the inferior sires are slightly more inbred than the superior group.—It was also found that all animals which appeared in the pedigrees of the superior sires on the male side more than 4 times or on the female side more than 3, also had appearances in the pedigrees of the sires inferior in their transmitting qualities.—A literature list and complete tables of raw data are presented in a special supplement to this bulletin.—*M. H. Fohrman.*

114. Pearl, Raymond. **A further note on war and population.** Science 53: 120–121. *1 fig.* 1921.—Vital statistics are presented showing that the vital index, 100 × deaths divided by births, for Vienna, England and Wales, and the U. S. A. reached a high point in 1918, dropping sharply at this point. The transitory effect of war on the death-birth ratio is emphasized.—*E. M. East.*

115. Pearl, Raymond. **The biology of death. V. The inheritance of duration of life in man.** Sci. Monthly 13: 46–66. *5 fig.* 1921.—This, the fifth of a series of papers on the general topic, treats of the factor of heredity. The writer reviews and discusses the work of Alexander Graham Bell on longevity in the Hyde family and the correlation studies of Pearson and Beeton; also the investigations of Ploetz of Munich and of E. C. Snow as bearing on the question of a selective death rate in man. The latter is supplemented by conclusions drawn from unpublished statistical work of F. S. Crum and Arne Fisher based on a large body of Dutch material. The final conclusions are that "the death rate of the earliest period of life is selective," and that "inheritance is one of the strongest elements, if not indeed the dominating factor, in determining the duration of life of human beings."—*Howard J. Banker.*

116. Pearson, Chas. E. **Protection for plant novelties.** Gard. Chron. 67: 8. 1920.—The author deprecates the present position of the raiser of new fruits, etc.; no method of protection is suggested. The paper is elicited by a previous article by Bliss.—*J. M. Shull.*

117. Plumb, C. S. **Types and breeds of farm animals.** *viii + 820 p., 1 pl., 366 fig.* Ginn & Co.: Boston & London, 1920.—This book is in four parts: Part I is devoted to the various breeds of horses, the ass, and the mule; part II, to cattle; part III, to sheep and goats; and part IV, to swine.—The following breeds of horses are discussed in part I: The Arab, Thoroughbred, American Saddle Horse, American Trotter and Pacer, Hackney, French Coach, German Coach, Cleveland Bay, Percheron, French Draft, Belgian, Shire, Suffolk, Ponies, Shetland.—The breeds of cattle discussed in part II are: Shorthorn, Polled Shorthorn, Hereford, Aberdeen Angus, Galloway, West Highland, Jersey, Holstein-Friesian, Guernsey, Ayrshire, Dutch Belted, French Canadian, Kerry, Dexter, Red Polled, Brown Swiss, and the Devon.—The breeds of sheep discussed in Part III are: Merino, American Merino, Delaine Merino, Rambouillet, Southdown, Shropshire, Oxford Down, Hampshire Down, Dorset Horn, Cheviot, Suffolk, Tunis, Leichester, Cotswold, Lincoln, Romney Marsh, Black-faced Highland, Corriedale, Karakul, Angora Goat, and the Milch Goat.—The breeds of swine discussed in Part IV are: Merkshire, Duroc-Jersey, Poland-China, Chester White, Hampshire, Mule-Foot, Large Black, Cheshire, Small Yorkshire, Essex, Large Yorkshire, and the Tamworth.—Chapters are devoted to descriptions of the light harness, the heavy harness, and the draft horse type; to the beef, the dairy, and the dual-purpose type cattle; to the fine-wool and the mutton type sheep; and to the lard type and the bacon type of pig.—Some idea of the scope of the discussion of each breed may be gained from the following outline of the chapter on the Percheron horse: The Native home of the Percheron horse, the origin of the Percheron breed, the improvement of the early Percheron, the early type of Percheron, Percheron deterioration, the type of Percheron about 1877, the improvement of the Percheron in France, the introduction of the Percheron to the United States, the characteristics of the Percheron horse, the color of the Percheron, the weight and height of the Percheron, the temperament of the Percheron, the maturing quality of the Percheron, cross-bred or grade Percherons, the prolificacy of the Percheron, famous Percheron sires, the leading Percheron shows, Percheron futurity shows, the prices paid for Percherons, Percheron geldings, the distribution of the Percheron horse, the distribution of Percherons in the United States, organizations for promoting Percheron horses, American Percheron horse associations.—*R. R. Graves.*

118. Pomona. **The pollination of fruit blossoms.** Gard, Chron. 69: 150–151. 1921.—It is stated that forms of *Malus* are in great measure sterile, and several examples are cited of barren trees becoming fruitful when the blossoms were artificially pollinated with pollen from other varieties, or when supplied with pollen from trees of other varieties planted in close proximity. The author warns against planting large blocks of single varieties and advocates mixed planting.—*C. S. Crandall.*

119. Reid, G. Archdall. **Biological terminology.** Nature 107: 265–266. 1921.—The author replies to Cunningham (Nature 106: 828. 1921).—*O. A. Stevens.*

120. Riddle, O. **Differential survival of male and female dove embryos in increased and decreased pressures of oxygen. A test of the metabolic theory of sex.** Proc. Soc. Exp. Biol. Med. 18: 88–91. 1920.—The attempt is made to measure the relative metabolic rates of dove embryos of different sex. Because of difficulties in doing this directly, the experiments were devised to test the differential survival of the sexes when the eggs during incubation were subjected to increased and decreased oxygen pressures and to low temperature for varying periods. It is argued that if male embryos have a higher metabolic rate than females they should succumb more readily to diminished oxygen pressure and *vice versa*, and the low temperature should by the same reasoning be more harmful to the males. Data are given which are interpreted as supporting this conclusion.—*L. J. Cole.*

121. Rowan, W., E. Wolff, the late P. L. Sulman, K. Pearson, E. Isaacs, E. M. Elderton, and M. Tildesley. **On the nest and eggs of the common tern (S. fluviatilis). A coöperative study.** Biometrika 12: 308–354. *6 pl.* 1919.—The authors report the continuation in 1914 of the study of a tern colony made in 1913. The following characters were recorded: (1) Length, (2) breadth, (3) longitudinal girth, (4) transverse girth, (5) tone or ground color, and (6) mottling, of eggs; and (7) type of nest, whether a simple depression in the ground or constructed of nesting materials. From a statistical treatment of these data more or less definite conclusions are reached. Some of these are as follows: As in 1913, broader eggs tend to have less mottling, attributed to possible pressure on the surface of the egg as it passes through the oviduct, thereby influencing the amount of pigment deposited. The eggs of 1914 are significantly larger and less variable, possibly correlated with a better food supply. Correlations believed significant were obtained between relatively longer eggs (those with greater ovality) and more elaborated nests. While correlation of nest type with ground color (brown or green) of egg was not significant, eggs with finer blotches seemed to be associated more frequently with the more elaborate nests; moreover "denser browns and lighter greens are somewhat more usual when the nest is a mere hole in the shingle, and lighter brown and darker green eggs are associated with more elaborately constructed nests."—The proportion of green to brown eggs in a clutch increases with the size of the clutch. Various explanations are suggested and tested statistically. Several other correlations are considered and there is some discussion of the physiological and evolutionary bearings of the results.—*L. J. Cole.*

122. Salisbury, E. J. [Rev. of: Reinheimer, H. **Symbiosis. A socio-physiological study of evolution.** *xii + 295 p.* Headley Brothers: London, 1920.] Sci. Prog. [London] 15: 671. 1921.

123. Schrader, Franz. **The chromosomes of Pseudococcus nipae.** Biol. Bull. 40: 259–270. *2 pl.* 1921.—The diploid number of chromosomes in both the male and the female of *Pseudococcus nipae* is 10. In the female, 5 tetrads are formed; these are normal in appearance. In the growth period 5 of the chromosomes condense in advance of the remaining 5, and can always be distinguished from the other chromosomes. There is no indication of a tetrad formation. In the 1st division all chromosomes divide and each daughter cell receives 10. In the 2nd division there is no chromosomal division but merely a separation of the chromosomes into 2 groups, those which were condensed first going to one pole and the others going to the other, thus giving rise to 2 kinds of spermatids each containing 5 chromosomes. Spermatozoa formation seems to follow normally.—*Mary T. Harman.*

124. Seiler, J. [German rev. of: Mohr, Otto L. **Mikroskopische Untersuchungen zu Experimenten über den Einfluss der Radiumstrahlen und der Kältewirkung auf die Chromatinreifung und das Heterochromosome bei Decticus verruccivorus (♂). (Microscopic studies relating to experiments on the influence of radium rays and effect of cold on maturation and the heterochromosome of Decticus verruccivorus (♂).)** Arch. Mikrosk. Anat. 92: 300–368. *6 pl.* 1919.] Arch. Zellforsch. 15: 312. 1920.

125. Shamel, A. D. **Coöperative improvement of citrus varieties.** California Citrograph 6: 141, 186, 199, 220–222. *7 fig.* 1921.—A general discussion of "bud variation" and "bud

selection" is presented. Citrus orchards studied generally showed 10–90 per cent of trees of inferior "strains," averaging about 25 per cent; rebudding such trees from superior trees has greatly increased the yield in many cases.—*Howard B. Frost.*

126. Shamel, A. D. **The Satsuma orange in southern Alabama.** California Citrograph 6: 308, 328–331. *6 fig.* 1921.—This popular article includes an outline of rules of the Alabama State Board of Horticulture regulating citrus propagation. After Nov. 1, 1921, the Board will furnish information to propagators about orchards suitable as sources of bud wood, and every lot of trees sold must carry a certificate tracing the trees to the parent orchard. From Nov. 1, 1924, similar provisions relating to the individual parent trees are to be enforced.—*Howard B. Frost.*

127. Shamel, A. D. **Top-worked citrus trees.** California Citrograph 6: 109, 134. *3 fig.* 1921.—The use of buds from performance-record trees in all top-working is urged.—*Howard B. Frost.*

128. Stout, A. B. **Conference notes for November and December.** Jour. New York Bot. Gard. 22: 15–19. 1921.—The author reported on flower types in grapes with reference to fruit development. Excellent study material is available at the New York Agricultural Experiment Station at Geneva, where thousands of European and American grape seedlings are raised. Breeding and selection of parentage are necessary to produce desirable flowers, particularly for production of seedless varieties. The latter are strongly male and weakly female. Crosses between seedless and near-seedless plants, used as the pollen parent, with strongly female plants result in strongly female and seed-producing progeny. Crosses between 1st-generation hybrids of standard seed varieties with Hubbard seedless resulted in strongly female plants producing seeded fruit, the strong femaleness of seeded fruit being dominant over weak femaleness of seedless fruit. Some seedless fruits may be expected by segregation in later generations. A few viable seeds may be produced by crossing seedless varieties, as pollen parent, and near-seedless varieties, as female parent, although most of these are generally strongly male. Thus, families may be obtained, strongly male and weakly female, producing some seedless fruit.—F. W. Pennell reported on the trend of evolution in American species of *Veronica* and near allies of the Scrophulariaceae, and T. Harvey Johnston on his mission to the U. S. A. for the Prickly Pear Travelling Commission.—At the December conference H. A. Gleason reported on "*Siphocampylus* and *Centropogon* in South America," and P. A. Rydberg on the genus *Diphysa*.—*Francena R. Meyer.*

129. Stout, A. B. **Types of flowers and intersexes in grapes with reference to fruit development.** New York Agric. Exp. Sta. Bull. 82. *16 p., 7 pl.* 1921.—A detailed report is presented of the different types of flowers among varieties of grapes together with an investigation into the probable cause of the production of seedless varieties. The usual classification of grape flowers into staminate, perfect hermaphrodite, and imperfect hermaphrodite for all general purposes is retained but the author points out that besides these flower types there are a number of variations. Especial attention is called to a flower type having a well developed pistil but rapidly degenerating stamens. The filaments instead of being straight and long are crinkled and the pollen is generally impotent. A description of several other types of flowers is included, with 7 plates and 39 figures.—The author points out that grape flowers for convenience may be grouped according to the degree of maleness or femaleness which they exhibit. Staminate flowers are male in character even though rudiments of the pistil may be observed. Imperfect hermaphrodites are weak in maleness because of the degeneration of the stamens and pollen grains. Perfect hermaphrodites are equally strong in both maleness and femaleness and these flowers are found associated with the best commercial varieties.—Fruitful perfect hermaphrodites with weakly developed pistils are weak in femaleness in inverse ratio to the number of viable seeds that are produced. It is among these flowers that the type is sought which is responsible for the production of seedless and nearseedless grapes.—A clear distinction is drawn between vines that produce seedless fruits developing from flowers requiring merely a pollen stimulus without true fertilization for fruit production, and those

that produce seedless fruit without any such stimulus; the latter are truly parthenocarpic in character. A few cases are cited of vines bearing 2 or more types of flowers during the same season; and, again, vines known to have changed their flower types from year to year in regard to the degree of femaleness and relative fruitfulness. Such cases indicate that fruitfulness of the vine can be stimulated by cultivation and better care.—Intersexualism is described as resulting from variations in the morphological development of stamens and pistils and in their ability to function sexually. It is always the result of a one-sided loss of sex or sexual power. It is contrasted with the sterility of hybridity, which manifests itself always in the deterioration of the functions of both sets of flower organs.—General suggestions are given for the production of seedless types of grapes by pollinating the near-seedless types which produce occasional seeds with pollen from the truly seedless types.—*L. R. Detjen.*

130. STURTEVANT, A. H. **Genetic studies on Drosophila simulans. II. Sex-linked group of genes.** Genetics 6: 43–64. *6 fig.* 1921.—Since hybrids between *D. simulans* and *D. melanogaster* are sterile, the genetic make-up of pure *D. simulans* has been studied. Seven sex-linked mutants are described, all of which resemble known sex-linked mutants of *D. melanogaster;* 5 of these have been shown by actual crossing to be allelomorphic with the corresponding *melanogaster* types, and 1 is certainly not allelomorphic. The crossover relations show that the order of these 5 allelomorphic genes in the 2 species is the same, but the amount of crossing over is not identical. Non-disjunction and gynandromorphism occur in *D. simulans,* and 2 apparent somatic mutations similar to known mutations in *D. melanogaster* occurred.—*H. H. Plough.*

131. STURTEVANT, A. H. **Genetic studies on Drosophila simulans. III. Autosomal genes. General discussion.** Genetics 6: 179–207. *6 fig.* 1921.—In this paper the autosomal genes of *D. simulans* so far discovered are described, and data are given on their genetic behavior both within the species and in interspecific hybrids with *D. melanogaster.* Six mutant genes are shown to belong to a group corresponding to the 2nd chromosome of *D. melanogaster,* and 7 to one corresponding to the 3rd. Direct tests in hybrids show that 2 of the 3rd-chromosome genes,—scarlet and peach,—are allelomorphic to similar genes in the other species, but they show about 15 times as much crossing over in *D. simulans.* One 2nd-chromosome gene produces intersexes,—females with a varying number of male characters. Two characters are described, each of which is dependent on genes located in 2 chromosomes. In addition to these facts a discussion of intersexual diptera is given, indicating that these forms may have a genetic constitution similar to that demonstrated for intersexual *D. simulans.* Finally, a discussion of the genetics of related species in general appears. It is brought out that parallel mutations in related species can be considered identical only when the genes are shown to be allelomorphic by actual hybridization tests. A number of investigators working with both plants and animals have established the fact that mutant genes of one species produce similar effects in interspecific hybrids,—that is, that identical wild-type genes are present. In this study for the first time it is shown that 7 similar mutations appearing independently in each of 2 species are actually allelomorphic as shown by crosses. Thus there is definite proof that related species have many genes in common and that identical mutations may occur in different species.—*H. H. Plough.*

132. STURTEVANT, A. H. **Intersexes in Drosophila simulans.** Science 51: 325–327. 1920.—A distinct sex-type, intermediate between male and female, is reported. The "intersex" resembles the female (penis and sex-combs absent, ovipositor and spermathecae present), but the genital tergite, anal plates, claspers, and coloring at tip of abdomen are approximately those of the male-type. There are no gonads. The sexual behavior is female-like. Genetically, intersexes are modified females, even the male parts having the XX constitution. The F_2 ratio is 3 ♀ : 1 ☿ : 4 ♂. The modifier is a 2nd-chromosome recessive (linked to plum, independent of yellow). The normal sex-producing mechanism is not interfered with, but its action is modified by a gene not even in the sex-chromosomes.—*Calvin B. Bridges.*

133. Thadani, K. I. **Some notes on cotton in Sind.** Agric. Jour. India **15**: 393–397. 1920.—A report is presented of natural crossing and the extent to which it occurs in *Gossypium neglectum*. The results show that vicinism causes 50–84 per cent of the plants to become affected by natural cross-fertilization. The author reports the existence of cleistogamic flowers.—*F. M. Schertz.*

134. Tischler, G. [German rev. of: Hertwig, Paula. **Haploide und diploide parthenogenese. (Haploid and diploid parthenogenesis.)** Biol. Zentralbl. **40**: 145–174. 1920 (see Bot. Absts. 6, Entry 1695).] Zeitschr. Bot. **13**: 463–465. 1921.

135. Tischler, G. [German rev. of: Täckholm, G. **On the cytology of the genus Rosa. (A preliminary note.)** Svensk. Bot. Tidskr. **14**: 300–311. *3 fig.* 1920 (see Bot. Absts. 7, Entry 243).] Zeitschr. Bot. **13**: 467–468. 1921.

136. Uphof, J. Th. **Breeding disease-resistant plants.** Gard. Chron. **69**: 275. 1921.—Examples are given of the successful control of plant diseases by means of the production of disease-resistant forms. The necessity of cooperation between the plant pathologist and the geneticist is emphasized.—*H. K. Hayes.*

137. Vilmorin, Jacques de. **Sur les croisements de pois à cosses colorées. [On the crossing of peas with respect to the color of the pods.]** Compt. Rend. Acad. Sci. Paris **172**: 815–817. 1921.—Among purple-flowered peas 1 variety is known with purple or partly purple pods, this character being dominant over green pod color. When purple is present in yellow-podded peas a bright red hue results. Among white-flowered plants grown at Verrières, some had faint traces of purple on the young green pods, and pink on the young yellow pods which disappeared as the pods matured. This case is similar to Lock's "ghost" mapled seeds in plants with white flowers, the complete manifestation of mapling being present only in purple-flowered plants.—A cross made between a white-flowered plant with young pods faintly marked with pink, and *Pisum elatius*, having purple flowers and green pods, resulted in a 1st-generation progeny all having purple pods, as was expected. The 2nd generation gave a wide variation of colors, the pods being green, purple, slightly purple, yellow, and red (purple present in yellow pods), and the flowers white, purple, and pink. The seeds were garnet, mapled, plain garnet, and, in the white-flowered plants, round white, or white faintly mapled. The same result was obtained in a 2nd cross using a pink-flowered plant with green pods as the male parent. In this cross the seeds of purple-flowered plants were red-speckled or plain red. Evidently these characters all behave in Mendelian fashion, but the number of individuals was too small to establish this fact. It is suggested that many so-called "latent" characters in animals and plants may be recognized by close observation, as, in the present instance, faint purple coloring in the green pods.—*Francena R. Meyer.*

138. Watson, J. A. S. **Problems of animal breeding.** Scottish Jour. Agric. **2**: 449–456. 1919.—The ideal type to be striven for by the breeder of livestock must be based on commercial utility. Not enough weight has been given to producing ability in breeding Ayrshires; too much weight is given to legs, pasterns, feet, and hair in judging Clydesdales and not enough to the more essential points, such as muscular development and width and substance of body. There is great need for the development of dual-purpose short-horns and disease-resistant sheep.—While neither practical breeders nor geneticists can point out easy methods by which the ideals in type and utility can be acquired, certain breeding principles are discussed. Mass selection: Selecting breeding stock on individuality alone frequently gives unsatisfactory results because the visible characters do not picture the inborn hereditary qualities. Family selection: The pedigree must be judged by the success as breeders of the immediate ancestors rather than by their individual merit, and selection should be made from good families rather than from good individuals. Inbreeding: Animals produced by violent out-crosses are generally unsatisfactory breeders and therefore the aim should be to have some degree of similarity of type between parents and some measure of actual blood relationship. The question of how closely inbreeding may be practiced can not be answered, but it is pointed out that in

thoroughbred horses an inbred animal has never won a race. The latest scientific contribution on inbreeding suggests that it is only a majority of an inbred strain that suffers the evil effects while the remainder may acquire all the benefits of inbreeding without any of the evil effects. The family craze: Pedigrees should be valued on the breeding ability of the immediate ancestors and the degree of consanguinity between them. The weight given to animals in distant generations is excessive. The family craze, which results in animals of fashionable families being retained for breeding purposes regardless of worth, and which permits good animals to go because they lack aristocratic names, is doing a great deal of harm. THOMAS BATES is blamed for initiating the family craze and it is pointed out that "our own AMOS CRUIKSHANK who cared nothing for families or for high-sounding names, would be a better model to imitate."—*R. R. Graves.*

139. WEBBER, HERBERT J. **The place of plant breeding in commercial seed companies.** Florists' Exchange 51: 1476–1477. 1921.—The author cites instances of successful plant-breeding work, both governmental and private, and discusses the alternative merits of plant breeding and of pedigreed-seed production by government agencies on the one hand and by private industries on the other. It is argued that government agencies should not engage in large-scale breeding for practical seed production if private companies can do the work equally well, and that the activities of government agencies act as a deterrent to private industry along these lines.—*J. Marion Shull.*

140. WELLINGTON, R. **Report on vegetable investigations being carried on by experiment stations and similar institutions.** Proc. Amer. Soc. Hort. Sci. 17: 267–275. 1920 [1921].—The main projects now under way are briefly described. These include studies in selection, breeding, and pollination with the vegetable crops.—*H. K. Hayes.*

141. WHITE, ORLAND E. **The pollination of flowers.** Brooklyn Bot. Gard. Leaflets Series $9^{3,4}$ *15 p.* 1921.—A general discussion of flower pollination is presented. The interrelationships between plants and insects are described in an interesting manner.—*H. K. Hayes.*

142. WOODWARD, B. B. [Rev. of: PELSENEER, PAUL. **Les variations et leur hérédité chez les mollusques. [Variations and their inheritance among the mollusks.]** Mem. Acad. Roy. Belgique Cl. Sci. Collection in 8°. II, 5: 1–826. *286 fig.* 1920.] Nature 107: 7. 1921.

143. WRIGHT, SEWALL. **Systems of mating. I. The biometric relations between parent and offspring.** Genetics 6: 111–123. *2 fig.* 1921.—The method of path coefficients previously determined by the author (see Bot. Absts. 9; Entry 280) is brought to bear on the various relationships which may exist between parent and offspring. After discussing the various consequences of the Mendelian mechanism expected in equilibrium and for the various systems of mating, the author points out how the effects of the residual heredity or the separate effects of heredity and environment may be measured mathematically. Methods of allowing for the effect of dominance are discussed as well as the expected relations between zygotes and gametes. His fundamental formula is $h^2 + d^2 + e^2 = 1$, in which h represents the constitution of the fertilized egg, d the tangible environmental factors, and e the intangible environmental factors. Different formulae are then offered to express the other relationships previously enumerated, and all are assembled in table 2 at the close of the paper, presenting the cases for consanguine mating, equilibrium, and random mating. The general formula in consanguine mating for the correlation between 2 parents is $r_{pp} = mh'$ in which m represents the correlation between egg and sperm and h' the zygotic constitution of the parents. Similarly, the correlation between parent and offspring is $r_{po} = abhh'\ (1 + m)$, in which a is the path coefficient from gamete to zygote, m and h' have the meaning previously given, h is the zygotic constitution of the offspring, and b is the correlation between the hereditary constitution of the gamete from the sire producing the individual in question and the hereditary constitution of the paternal zygote. The correlation between 2 offspring is $r_{oo} = 2a^2b^2h^2\ (1 + m) + e^2$.—*Edward N. Wentworth.*

144. Wright, Sewall. **Systems of mating. II. The effects of inbreeding on the genetic composition of a population.** Genetics 6: 124–143. *12 fig.* 1921.—The results of different systems of inbreeding on the composition of the population are expressed in terms of variation which is purely genetic, although the method of considering the tangible and intangible environmental factors is demonstrated. The method of path coefficients is shown to be more general in application than the previous methods of attack on the results of inbreeding, and the series for the percentages of heterozygosis in descendant generations as calculated by previous investigators was shown to agree with the results secured by the method of path coefficients. The series for brother-sister matings, self-fertilization, parent–offspring matings, double first cousins, and single first cousins was developed, followed by more complex systems impracticable of development under the older methods. Such matings as quadruple second cousins, octuple third cousins, half brother and sister, half brother and 2 sisters, half brother and 2 half sisters plus half sister with 2 half brothers, half first cousins and second cousins are developed in detail, and their relation to practical breeding demonstrated.—*Edward N. Wentworth.*

145. Wright, Sewall. **Systems of mating. III. Assortative mating based on somatic resemblance.** Genetics 6: 144–161. *7 fig.* 1921.—Selective mating based on somatic types such as is commonly followed by practical breeders is analyzed by the method of path coefficients. The general theory is discussed, first in the absence of dominance. The author assumes that a certain correlation, r_{pp}, exists between the mated individuals because of their somatic resemblance. He further assumes that the somatic correlation implies a correlation, m, between the zygotic constitutions. This requires that there be a correlation between factors of different sets of allelomorphs which act on the same character. There are 2 types of this correlation, f_u representing the correlation between factors of the same set of allelomorphs, and j_u the correlation between factors of different sets of allelomorphs. Assuming the same relative frequency of dominant to recessive factors in the case of all allelomorphs, the author calculates a series of formulae. One interesting contingency arising in the case of matings based on somatic resemblance that does not arise in the case of matings based on blood relationships is that somatic resemblances indicate not only a tendency to mate individuals of like genetic composition but also individuals affected by similar external conditions. He then develops a means of separating these 2 effects. Discussions are presented of the expectations in the case of equilibrium in the population, in the case of dominance, and in the case of assortative mating combined with inbreeding. This latter form of mating is demonstrated to be the most rapidly effective since it combines the correlation due to inbreeding with the correlation between uniting gametes due to the relation of the zygotic constitution to the somatic type.—*Edward N. Wentworth.*

146. Wright, Sewall. **Systems of mating. IV. The effects of selection.** Genetics 6: 162–166. *1 fig.* 1921.—After reviewing the expectation in the case of selection for 1 factor, and showing that no fixation of type can occur in the case of heterozygotes lacking dominance, the author considers the effect of selection on a characteristic depending on n pairs of allelomorphs. He assumes plus and minus factors of each pair to be equally numerous, all factors to be of equal weight, and dominance absent. The distribution of plus factors in $(2n + 1)$ classes can be found from expanding $(\frac{1}{2} + \frac{1}{2})^{2n-1}$, and assuming the coefficients thus obtained to begin with the class having the greatest number of plus factors present. The distribution of the minus factors can be found by the same formula, but it is necessary to begin their application with the class having the next greatest number of plus factors present. This permits determination of the ratio of plus factors to total factors in any class, it being always $\frac{1}{2}$ of the middle class. For a deviation of x classes beyond the middle the ratio q is shown to be $\frac{n+x}{2n}$ or in terms of the standard deviation s, $\frac{1}{2}\left(1 + \frac{s}{\sqrt{2n}}\right)$. By selecting for mating only individuals of a middle class, the author shows that the only effect lies in the 1st selection, and return to random breeding reestablishes the same proportions as were found in the original unselected population. In a population of limited size this intermediate type may be

fixed since there will be a degree of inbreeding consequent upon small numbers. If selection is directed toward a type between a mean and one of the extremes almost the full effect of selection is reached in the 1st generation and further selection merely reduces the variability slightly. If all the variation is not due to genetic causes, the usual condition, the point will be reached below which variation can not be reduced and selection therefore becomes continually more ineffective.—*Edward N. Wentworth.*

147. Wright, Sewall. **Systems of mating. V. General considerations.** Genetics 6: 167–178. *7 fig.* 1921.—In this paper the author discusses some of the more important results of his previous papers (see the preceding 4 entries) unencumbered by mathematics. He shows that with random mating, inbreeding, or assortative mating, the relative frequency of the different genetic factors in the original population remains constant in any subsequent descendant population as a whole and random breeding restores the original composition. On the other hand, selection which is due to a differential rate of reproduction among different classes modifies the relative frequencies of genetic factors and effects a permanent change. The combination of all systems of mating he has studied is shown to be the most effective way of modifying the characteristics of a stock. Charts showing the differential rates of progress under different systems of mating are presented. The rate of obtaining homozygosis is considered important since it measures the permanency of the change effected by the system of mating and is a very important quality in increasing prepotency. It is shown that selection produces progress toward perfect homozygosis only when directed toward an extreme type. Close inbreeding or assortative mating leads to increased variability in the population as a whole while disassortative mating holds the population together. Matings between relatives more remote than first cousins have little significance as inbreeding unless the population is small.—*Edward N. Wentworth.*

148. Ziegler, A. **Unterscheidungsmerkmale der Gerste mit besonderer Berücksichtigung der Basalborste. [Distinguishing characters of barley with special reference to the basal bristles.]** Deutsch. Landw. Presse 47: 184–185. 1920.—A description is given of 2 types of basal bristle in 2-rowed barley: Type A, hairs long, sharp-pointed, single-celled; type C, hairs shorter, branched, blunt, and usually several-celled. The author finds non-heritable variations within the type, but the types themselves are well separated by these distinguishing characters.—*F. P. Bussell.*

HORTICULTURE

J. H. Gourley, *Editor*

H. E. Knowlton, *Assistant Editor*

(See also in this issue Entries 28, 84, 85, 99, 125, 126, 127, 128, 129, 140, 211, 231, 248, 294, 295, 303, 314, 319, 381)

FRUITS AND GENERAL HORTICULTURE

149. Anonymous. **[Rev. of: Copeland, E. B. The coconut.** *2nd ed. revised, xvi + 225 p.* Macmillan and Co.: London, 1921.] Nature 107: 391. 1921.

150. Allen, R. H. **Eighteenth annual report of the state nursery inspector.** Massachusetts State Nursery Inspector Ann. Rept. 18: 1–12. 1920.—One hundred and forty eight nurseries were inspected and certificates issued, also 200 shipments of foreign stock were examined. A list of the insects and fungous diseases found is given. Work in the control of white pine blister rust was carried on in cooperation with the U. S. Department of Agriculture. Eradication of *Ribes* in the southeastern area was continued, and through financial aid from the State Forestry Department and private sources further work in Petersham and other towns was carried on. A tabulated summary of the work done and costs is given. The European corn borer was found in extended areas and the work of eradication in infested areas and maintaining a quarantine against these areas continued.—*J. K. Shaw.*

151. Allen, W. J. **The pruning of Rome Beauty.** Agric. Gaz. New South Wales 32: 429–434. *10 fig.* 1921.

152. Bakke, A. L., W. A. Radspinner, and T. J. Maney. **A new factor in the determination of the hardiness of the apple.** Proc. Amer. Soc. Hort. Sci. 17: 279–289. 1920 [1921].—The investigators used the current season's wood growth of 18 varieties of apples, 15 years old, and wood from varieties of nursery trees 2 years old. Samples were collected during the dormant season, when the buds were swelling, at blossoming time, during summer growth, and at the wood-ripening period. Tests were made on each for the depression of the freezing point, water content, ash content, and hydrogen-ion concentration. Since the hydrogen-ion concentration proved to be the same throughout, it was dropped from consideration. Tables are given for each period and include the date of collecting, variety, freezing point lowering, per cent of moisture, and the hardiness factor. In separating the varieties into groups of 4 according to recognized hardiness the per cent of ash generally increases as hardiness decreases, which appears to be of some significance. During the period at which buds are swelling the lowering of the freezing point is least. The authors state "the results obtained point out the possibility of using the depression of the freezing point and the moisture content as an index in ascertaining comparative hardiness. The solutes which are responsible for differences in the ash appear to be significant in the general question of hardiness." It is thought that measurements and tests to determine the hardiness should be made at a time when the metabolic processes of the plant are at their maximum.—*H. W. Richey.*

153. Chasset, L. **Éborgnage d'hiver des yeux du poirier.** [Winter disbudding of pear trees.] Rev. Hort. 93: 263–264. 1921.—If branches are cut back in winter, 2 strong branches almost certainly will develop immediately below the cut, and the buds remaining below them are starved. By carefully judging the amount of heading according to the vigor of the variety and age of the tree, and then removing the 2 buds immediately below the topmost one, the remaining buds are nourished to better advantage, and the development of fruit buds and fruit spurs is likely to follow.—*E. J. Kraus.*

154. Chasset, L. **Quelques bonnes cerises à cultiver.** [Some good cherries worth growing.] Rev. Hort. 93: 274–275. 1921.—A list is given of several varieties, suitable for various regions.—*E. J. Kraus.*

155. Cooper, J. R. **Commercial grape growing.** Arkansas Agric. Exp. Sta. Bull. 174. *40 p., 16 pl.* 1921.—The author presents a general bulletin giving recommendations for the selection of varieties for Arkansas, directions for preparation of the soil, planting, trellising, and pruning. Fruiting habits and systems of training are described and illustrated. Methods of cultivation, cover-cropping, and fertilizing suited to Arkansas conditions, are given. A discussion of pests includes brief descriptions of some of the insect pests and diseases, with general control measures, a spray schedule, and a discussion of spray materials used.—*D. Reddick.*

156. Enfer, V. **Les incisions sur les branches charpentiers du poirier.** [Incisions on the scaffold branches of the pear.] Rev. Hort. 93: 250–251. 1921.—Specific directions are given on making incisions in the vicinity of several types of branches in order to direct the character of the growth of the branches, behavior, and fruit-bud production.—*E. J. Kraus.*

157. H., T. A. **Cocoa and chocolate.** [Rev. of: Knapp, A. W. **Cocoa and chocolate: their history from plantation to consumer.** *xii + 210 p.* Chapman and Hall: London, 1920.] Nature 107: 357. 1921.

158. Jahandiez, E. **La grande gelée des 17 et 18 décembre 1920 sur le littoral méditerranéen.** [The great freeze of December 17 and 18, 1920, on the Mediterranean coast.] Rev. Hort. 93: 266–267. 1921.—Notes are given on the extent of the damage to many species of plants caused by temperatures ranging to as low as −13°C. in various sections.—*E. J. Kraus.*

159. Manuel, H. L. **Vineyard notes for June.** Agric. Gaz. New South Wales 32: 437–438. 1921.

160. Rolfs, F. M. **Report of horticultural department.** Oklahoma Agric. Exp. Sta. Rept. 29: 46–53. 1920.—This article gives a report of progress on various horticultural and pathological projects.—*John A. Elliott.*

161. Swartwout, H. G. **Small fruit growing in Missouri.** Missouri Agric. Exp. Sta. Bull. 184. *27 p.* 1921.—This is a brief discussion of the culture of small fruits. The results of 2 years varietal experiments with raspberries, blackberries, and strawberries are reported.—*L. J. Stadler.*

162. Wilding, E. H. **Hybridization; the elimination of foreign interference.** Rhododendron Soc. Notes 2: 48. 1920 [1921].—To eliminate the possibility of the introduction through insect agency of other pollen than that applied artificially, the floral envelope together with the stamens is removed when about half developed. The pistils deprived of the corolla were not visited by insects and only those developed seed capsules which were fertilized artificially. In 1 case 200 flowers were treated, of which 50 were fertilized artificially; of the latter 43 set seed capsules, while of the 150 not artificially fertilized, not one developed into a seed capsule.—*Alfred Rehder.*

FLORICULTURE AND ORNAMENTAL HORTICULTURE

163. Anonymous. **[Notes.]** Rhododendron Soc. Notes 2: 1–50. 1920 [1921].—The number for the year 1920 contains 17 mostly short notes contributed by members of the Society; of these notes, 15 consist chiefly of reports on the behavior, hardiness, flowering, cultivation, etc., of rhododendrons in different places in Great Britain. [See also Bot. Absts. 10, Entry 162.]—*Alfred Rehder.*

164. Anonymous. [Rev. of: Stout, Mary, and Madeline Agar. **A book of gardening for the sub-tropics.** *200 p.* F. and G. Witherby: London, 1921.] Nature 107: 232. 1921.—This book applies particularly to the Cairo district.—*O. A. Stevens.*

165. Bonvallet, E. **Le pyrèthre rose (Pyrethrum roseum). [Pyrethrums.]** Rev. Hort. 93: 262–263. *1 pl. (colored).* 1921.—Brief cultural notes and somewhat detailed descriptions of several types, and of a dozen named varieties, are given.—*E. J. Kraus.*

166. Heede, A. van den. **Rusticité des souches de Dahlias. [Hardiness of dahlia stocks.]** Rev. Hort. 93: 248. 1921.—In northern France, dahlia roots remained without injury in the open ground over winter when protected by a covering of manure and leaves 50 cm. in depth.—*E. J. Kraus.*

167. Millet, L. **Quelques nouvelles violettes. [Some new violets.]** Rev. Hort. 93: 246–247. *1 pl. (colored).* 1921.—The varieties Coeur d'Alsace and Souvenir de ma Fille are figured and their origin and qualities noted in detail; several others are mentioned.—*E. J. Kraus.*

168. Morel, F. **Le Weigélia à feuilles pourpres: Diervilla florida Sieb et Zucc. [The purple leaved weigelia.]** Rev. Hort. 93: 278–279. *1 pl. (colored).* 1921.—The variety is a seedling of *D. florida*, selected and introduced by L. Chenault.—*E. J. Kraus.*

169. Mottet, S. **Clematis Armandi grandiflora.** Rev. Hort. 93: 276–278. *Fig. 68.* 1921.—Detailed descriptive and brief cultural notes are given. The variety is considered much superior to *C. Armandi.*—*E. J. Kraus.*

170. Mottet, S. **Le pin de Macedoine (Pinus Peuce). [The Macedonian pine.]** Rev. Hort. 93: 244–246. *Fig. 62–63.* 1921.—Because of its entire hardiness, resistance to drought, and its compact growth, this species is well adapted for planting in small gardens and as specimens on lawns.—*E. J. Kraus.*

171. Pinelle, J. **Nerprun hybride: Rhamnus hybrida. [Hybrid Rhamnus.]** Rev. Hort. 93: 264–265. *Fig. 67.* 1921.—The tree is excellent for planting singly or in masses on poor soils. Brief historical and descriptive notes are given.—*E. J. Kraus.*

172. Poupion, J. **Le Saurauja punduana Wall.** Rev. Hort. 93: 260–262. *Fig. 65–66.* 1921.—Descriptive and detailed cultural notes are given.—*E. J. Kraus.*

173. Poupion, J. **Phytelephas macrocarpa: sa culture en serre. [Greenhouse culture of P. macrocarpa.]** Rev. Hort. 93: 248–249. *Fig. 64.* 1921.—General directions for planting the seeds, care of seedlings, and maintaining the plants are given.—*E. J. Kraus.*

174. Puvilland, J. **Marronnier d'Inde à fleurs blanches pleureur: Aesculus hippocastanum var. pendula. [White-flowered weeping horse-chestnut.]** Rev. Hort. 93: 281. 1921.

175. Rolet, A. **Les oeillets crevards. [Split carnations.]** Rev. Hort. 93: 275–276. 1921.—Quickened vegetation after a period of relative inactivity, excess of nitrogen, lack of light, irregular temperatures, dry soils, and character of the variety are among the factors which have been assigned as causes of calyx splitting. The subject is still a matter for investigation of individual varieties.—*E. J. Kraus.*

VEGETABLE CULTURE

176. Meunissier, E. **L'épinard: culture printanière. [Spring culture of spinach.]** Rev. Hort. 93: 251–252. 1921.

MORPHOLOGY, ANATOMY AND HISTOLOGY OF VASCULAR PLANTS

E. W. Sinnott, *Editor*

(See also in this issue Entries 91, 133, 294, 295, 302)

177. Bateson, W. **Variegation in a fern.** Nature 107: 233. 1921.—The author corrects a statement made in the Croonian Lecture (see Bot. Absts. 8, Entry 226). Prothallia of variegated *Adiantum* show light areas when examined by transmitted light.—*O. A. Stevens.*

178. Briquet, J. **Sur la présence d'acarodomaties foliaires chez les Clethracées. [On the presence of foliar acarodomatia among the Clethraceae.]** Compt. Rend. Soc. Phys. et Hist. Nat. Genève 37: 12–15. 1920.—Foliar acarodomatia are unknown among the Clethraceae except in 1 species, *Clethra barbinervis* Sieb. et Zucc., of China and Japan. The leaves have 2 kinds of trichomes, strigose and stellate. At the points where the lateral veins leave the midrib, there is a dense tuft of fascicled hairs, persisting throughout the duration of the leaf. These usually contain mites or their remains.—*A. Gundersen.*

179. Briquet, J. **Sur l'organization et l'edaphisme des feuilles ericoides chez les Pertya phylicoides Jeffrey. [On the organization and edaphism of the ericoid leaves of Pertya phylicoides Jeffrey.]** Compt. Rend. Soc. Phys. et Hist. Nat. Genève 37: 15–19. 1920.—The species of the genus *Pertya*, Compositae-Mutisieae, have no special vegetative peculiarities; *Pertya phylicoides*, described in 1912 and growing on arid calcareous cliffs in Yunnan at 3000 m. altitude, is, however, an exception. The leaf is completely rolled, forming an interior chamber filled with long hairs. The chamber communicates with the exterior by a long slit, narrower toward the summit. Very minute stomata are numerous on the inside. The parietal canals of the exterior epiderm probably facilitate the rapid growth of the thick cuticle.—*A. Gundersen.*

180. Campbell, D. H. **The eusporangiate ferns and the stelar theory.** Amer. Jour. Bot. 8: 303–314. *7 fig.* 1921.—Following Van Tieghem's stelar hypothesis, it is commonly assumed that the fibrovascular skeleton of the fern stem is a strictly cauline stele with which

the corresponding foliar bundles are connected by the so-called "leaf traces." The author presents evidence that in the Ophioglossales and Marattiales, at any rate, the stelar system begins as a single strand common to the first leaf and root. The stem is absent or insignificant at first and no procambium is developed within it. In the Ophioglossales and the earlier stages of the Marattiales the stelar structures of the stem are built up entirely of leaf traces, though in older plants of the latter order a few true cauline strands are formed. The "foliar gaps" are not breaks in a single tubular stele but are merely spaces between coalescent leaf-traces. The cortex is largely of foliar origin, also, and the pith is not stelar in nature but is a portion of the ground tissue which has been surrounded by coalescent foliar steles. The condition found in the axis of the eusporangiate ferns is more in accord with the older theory of "common" bundles traversing a ground tissue and united to form the woody cylinder of the axis, than with the assumption of a true cauline stele. This condition is probably also characteristic of the Eusporangiatae. In the lycopods, conifers, and many angiosperms, however,—groups in which the leaf is not the dominant portion of the shoot,—a cauline stele is undoubtedly present.—*E. W. Sinnott.*

181. Denham, H. J. **Method of cutting cotton hairs.** Nature 107: 299. 1921.—The method is a modification of that of Breckner (Zeitschr. Wiss. Mikrosk. 25: 29. 1909). The author uses a coating of celloidin followed by paraffin-wax, and imbeds in paraffin.—*O. A. Stevens.*

182. Harris, J. Arthur, and Edmund W. Sinnott. **The vascular anatomy of normal and variant seedlings of Phaseolus vulgaris.** Proc. Nation. Acad. Sci. [U. S.] 7: 35–41. *4 diagrams.* 1921.—The authors report on a statistical study, employing pure lines. Trimerous seedlings, with 3 cotyledons and 3 primordial leaves, typically have one-half more root protoxylem poles, hypocotyledonary bundles, and primary epicotyledonary bundles, than normal (dimerous) seedlings. Intercalary bundles often occur in the hypocotyl, more frequently in dimerous than in trimerous seedlings. The number of primary bundles, intercalary bundles, and double bundles which divide is notably variable; this variability differs with the type of seedling and the region considered. Both in dimerous and in trimerous seedlings, the total number of bundles at the base of the hypocotyl shows considerable positive correlation with the total number in the mid-region of the hypocotyl, but little or none with the total number in the mid-region of the epicotyl.—*Howard B. Frost.*

183. Souèges, René. **Embryogenie des Labiées. Dévelopement de l'embryon chez le Mentha viridis L.** [Embryogeny of the Labiatae. Development of the embryo of Mentha viridis.] Compt. Rend. Acad. Sci. Paris 172: 1057–1058. 1921.—The development of the embryo of this plant resembles very much that of *Veronica arvensis*, the same difference occurring between *Mentha viridis* and *Veronica arvensis* as between *Capsella bursa pastoris* and *Oenothera biennis.*—*C. H. Farr.*

MORPHOLOGY AND TAXONOMY OF ALGAE

E. N. Transeau, *Editor*

(See in this issue Entries 325, 332)

MORPHOLOGY AND TAXONOMY OF BRYOPHYTES

Alexander W. Evans, *Editor*

(See in this issue Entries 325, 328)

MORPHOLOGY AND TAXONOMY OF FUNGI, LICHENS, BACTERIA, AND MYXOMYCETES

H. M. Fitzpatrick, *Editor*

(See in this issue Entries 268, 292, 325 and those in the Section Pathology)

PATHOLOGY

G. H. Coons, *Editor*

C. W. Bennett, *Assistant Editor*

(See also in this issue Entries 6, 9, 11, 27, 38, 66, 67, 80, 99, 106, 136, 150, 160, 175, 304, 305, 315)

PLANT DISEASE SURVEY (REPORTS OF DISEASE OCCURRENCE AND SEVERITY)

184. Bethel, Ellsworth. **Notes on the Peridermiums of pines in Colorado and California.** [Abstract.] Phytopathology 11: 45. 1921.

185. Drechsler, Charles. **Occurrence of Rhyncosporium on Dactylis glomerata and Bromus inermis.** [Abstract.] Phytopathology 11: 42. 1921.

186. McCubbin, W. A. **The present status of the potato wart in Pennsylvania.** [Abstract.] Phytopathology 11: 58. 1921.

187. Seymour, Edith K., and Frank T. McFarland. **Loss from rye ergot.** [Abstract.] Phytopathology 11: 41. 1921.

188. Stakman, E. C., R. S. Kirby, and A. F. Thiel. **The regional occurrence of Puccinia graminis on barberry.** [Abstract.] Phytopathology 11: 39–40. 1921.

189. Wollenweber, H. W. **Der Kartoffelkrebs, seine Verbreitung und Bekämpfung. [The potato canker, its distribution and control.]** Zeitschr. Kartoffelbau 1[7]: 61–64. *Fig. 1–3.* 1921.—Potato wart disease, at first restricted to small plantations, has spread widely in spite of all warnings and exclusion measures and is now a problem for the serious consideration of potato growers generally. Disease has been reported from Hungary, England, Scotland, Ireland, Germany, Newfoundland, Holland, Sweden, Norway, and the U. S. A. It seems to have since disappeared in Hungary and to have been eradicated from Sweden; in Norway and Ireland it has been kept from spreading by fallowing infected land. On the other hand, it has spread widely in England and in Germany, so that in the aggregate 1500 hectares are infested in Germany and 2500 in the northern hemisphere. It is significant that all loci of infection in Europe are found between the 50th and 60th parallels, while in America the altitude of the infested regions is such that it occurs down to 40° latitude.—Sulphur, mercuric chloride, and sulphuric acid have not been effective as soil disinfectants, but Ericksson found the application of 10 l. of 1 per cent formaldehyde per square m. successful in disinfecting soil; also tools and storage bins. The remarkably long persistence of the pathogene in the soil and the fact that the tomato, nightshade, and bittersweet may serve as hosts make starving out processes tedious and uncertain in result. The use of immune varieties is the only practicable means of control known. Some immune varieties are of high commercial value, but many have been abandoned by their originators owing to poor yield or susceptibility to other disease. Maximum value in each of these respects, as well as immunity to the wart disease, must be the breeder's goal in future work. A list of varieties immune to wart and of widest adaptability to German conditions of potato culture is given.—*F. Weiss.*

THE HOST (RESISTANCE, SUSCEPTIBILITY, MORBID ANATOMY AND PHYSIOLOGY)

190. Crawford, R. F. **Overwintering of mosaic on species of Physalis.** [Abstract.] Phytopathology 11: 47. 1921.

191. Dickson, James G. **The influence of soil temperature on the development of seedling blight of cereals caused by Giberella saubinetii.** [Abstract.] Phytopathology 11: 35–36. 1921.

192. DOOLITTLE, S. P. **Influence of temperature on the development of mosaic diseases.** [Abstract.] Phytopathology 11: 46–47. 1921.

193. DOOLITTLE, S. P. **The relation of wild host plants to the overwintering of cucurbit mosaic.** [Abstract.] Phytopathology 11: 47. 1921.

194. FROMME, F. D., AND S. A. WINGARD. **Varietal susceptibility of beans to rust.** Jour. Agric. Res. 21: 385–404. *5 pl.* 1921.—The relative susceptibility of 64 varieties of garden and field beans to rust (*Uromyces appendiculatus*) has been determined, taking the susceptibility of the variety Tennessee Green Pod as a standard. Variation from the standard in reduction in number of infections, reduction of size of uredinium, abortion of infection, immediate production of telia instead of uredinia, and lengthening of the period of infection, has been considered. With the exception of a few varieties, little or no variation occurred in the susceptibility of individuals in the majority of varieties studied. Correlation between rust-resistance and various plant and seed characters were observed. As a class, bush beans are more resistant than pole beans, and varieties with wax pods more resistant than those with green pods. Varieties having red (mottled or self-colored seeds) are resistant. White-seeded types, as a class, are more susceptible than colored-seeded types. Varieties having the "marrow" type of seeds are resistant, while those of the "pea" type are most susceptible. Experiments with dry-shell beans show that the rust, under certain conditions, may reduce the yield of seeds 50 per cent or more. Two biological strains of the rust fungus are described.—*W. H. Burkholder.*

195. FROST, JOHN F., AND G. N. HOFFER. **Kernel starchiness as an index of susceptibility to root, stalk, and ear-rots of corn.** [Abstract.] Phytopathology 11: 33–34. 1921.

196. McCLINTOCK, J. A. **Overwintering of mosaic of annuals.** [Abstract.] Phytopathology 11: 47. 1921.

197. NELSON, RAY. **Tissue breakdown in fruits and vegetables.** [Abstract.] Phytopathology 11: 44. 1921.

198. WEISS, FREEMAN, AND C. R. ORTON. **Second report of the reaction of American potato varieties to the wart disease.** [Abstract.] Phytopathology 11: 57. 1921.

THE PATHOGENE (BIOLOGY, INFECTION PHENOMENA, DISPERSAL)

199. FAWCETT, H. S. **Some relations of temperature to growth and infection in the citrus scab fungus, Cladosporium citri.** Jour. Agric. Res. 21: 243–253. 1921.—Tests were made under controlled conditions to determine thermal relations. Sour orange (*Citrus aurantium*) seedlings in actively growing condition were used. The conditions for infection are, viable spores of *Cladosporium*, young leaves of a susceptible species, moisture, and temperatures between 16 and 23°C. Detached leaves are infected at temperatures from 16 to 27.5°C.; the optimum temperature is from 16 to 27.5°C. The optimum temperature for growth of *C. citri* is 21°C., with 27.5 the maximum in water and 32 on corn-meal agar. The incubation period is shortest with plants held at 21°C.—*Cladosporium citri* is atypical for the genus. At certain temperatures the spores are ejected with considerable force from the ends of the hyphae.—*D. Reddick.*

200. JACKSON, H. S., AND E. B. MAINS. **The aecidium of the orange rust of wheat, Puccinia triticina.** [Abstract.] Phytopathology 11: 40. 1921.

201. McFARLAND, FRANK T. **Infection experiments with Claviceps.** [Abstract.] Phytopathology 11: 41–42. 1921.

202. MONTEITH, JOHN, JR. **Seed transmission and overwintering of cabbage black rot.** [Abstract.] Phytopathology 11: 53–54. 1921.

203. Rand, Frederick V., and Lillian C. Cash. **Stewart's disease of corn.** Jour. Agric. Res. 21: 263–264. 1921.—Wilt of maize, caused by *Aplanobacter stewarti*, is widely distributed in the U. S. A. Sweet corn is most affected, and of its varieties the early-maturing ones are most susceptible (up to 100 per cent), the late-maturing ones least so. In tests with 45 varieties of field corn, 32 have shown no wilt. A few varieties of dent field corn have shown up to 5 per cent infection, and early-maturing varieties of flint corn are more susceptible than late-maturing ones.—"No evidence whatever of infection from the soil or from proximity to diseased stalks has thus far been obtained." Seed transmission is indicated. Infection of young plants is most likely during the first 2 weeks of growth; high soil moisture at this time results in much infection, the amount under identical moisture conditions being greater at higher temperatures. Heating seed at 60 to 70°C. for 1 hour is a promising method of control.—*D. Reddick.*

204. Richards, B. L. **The pathogenicity of Corticium vagum as affected by soil temperature.** [Abstract.] Phytopathology 11: 56. 1921.

205. Walker, J. C., and L. R. Jones. **The relation of soil temperature and other factors to onion smut and infection.** [Abstract.] Phytopathology 11: 52–53. 1921.

206. Weston, W. H. **Significant points in the life history of the Philippine maize mildew.** [Abstract.] Phytopathology 11: 32. 1921.

DESCRIPTIVE PLANT PATHOLOGY

207. Barthe, A. E. **La Oficina de Sanidad Vegetal de la Secretaría de Agricultura, Comercio y Trabajo. Resumen de las plagas ya estudiadas y combatidas. [Review of the plagues so far studied and combatted.]** Rev. Agric. Com. y Trab. [Cuba] 3: 290–296. *15 fig.* 1920.—An account is given of bud rot of coconut which is said to have reduced exportation of coconuts by a third in 15 years. For control various sanitary measures are recommended together with the spraying of new plantations in affected areas with a mixture of Bordeaux and Paris green. The Panama disease of plantains is found through Cuba except in the Orient province. Affected plants nearing maturity develop yellow leaves which soon fall, the raceme develops poorly, and a cross section of the trunk shows yellow, red, or black spots. Burning of diseased plants, sterilizing tools, and a rotation are recommended. Sugar cane mosaic is also discussed.—*F. M. Blodgett.*

208. Beach, W. S. **A Phytophthora crown rot of rhubarb.** [Abstract.] Phytopathology 11: 55–56. 1921.

209. Birmingham, W. A. **Ergot.** Agric. Gaz. New South Wales 32: 410–412. *8 fig.* 1921.—A popular description of the disease and methods of control are presented.—*L. R. Waldron.*

210. Bisby, G. R. **Sclerotinia disease of sunflower in Manitoba.** [Abstract.] Phytopathology 11: 49. 1921.

211. Coons, G. H., and Ray Nelson. **Celery yellows.** [Abstract.] Phytopathology 11: 54–55. 1921.

212. Elliott, John A. **A new Phoma disease of cotton.** [Abstract.] Phytopathology 11: 48. 1921.

213. Gilman, J. C. **A Fusarium wilt of corn in Iowa in 1920.** [Abstract.] Phytopathology 11: 33. 1921.

214. Gloyer, W. O. **Blister canker of apple and its control.** New York Agric. Exp. Sta. [Geneva] Bull. 485. *71 p., 15 pl.* 1921.—Data are presented which establish the pathogenicity of *Nummularia discreta* (Schw.) Tul. as the causal agent of lesions occurring on the trunks

and branches of the cultivated apple (*Malus sylvestris*) and commonly known as blister canker. The disease produced appears in several different forms called staghead, yellow streak, sunscald, the enclosed form, and the common form. Cankers resulting from artificial inoculation enlarge most rapidly at the beginning of growth in the spring. When the wood is parasitized without the formation of cankers the presence of the fungus may be detected by the appearance of black streaks in the wood. The fungus is disseminated chiefly by means of the ascospores, which are discharged normally in August. Usually, 2 years are required for the maturity of the ascospores. The virulence of the disease and the success of attempts to control it are largely dependent upon environmental and other conditions, such as location, soil, rainfall, pruning, spraying, variety, overbearing, and age of host. Shellac followed by coal tar was found to be the most satisfactory dressing for the wounds made in pruning out diseased branches.—*F. C. Stewart.*

215. Hiley, W. E. **The larch needle-cast fungus, Meria laricis Vuill.** Quart. Jour. Forest. 15: 57–62. *2 fig.* 1921.—This fungus appears to be exceedingly common in Britain. It causes young larch needles to turn brown and fall during the summer months. This type of leaf-cast has commonly been attributed to frost, but can easily be distinguished from frost injury. The youngest needles are not affected, only those a few inches from the shoot apices, and the disease spreads gradually up the shoots. The needle is not killed outright as when frosted; instead the apex first becomes brown and this discoloration then spreads gradually to the base. The bulk of the needles on the dwarf shoots are unaffected. The disease is most prevalent in wet weather, and most destructive in the nursery. Young plantations are often attacked and trees as much as 30 feet high have become very brown in August. As stems are unaffected by the disease, trees are seldom if ever killed. The European and western American larches are subject to attack, but the Japanese larch seems immune. Fruiting bodies of the fungus are formed only in a humid atmosphere. They consist of bundles of conidiophores growing out through the stomata. The hyphae, which compose the bundle, are colorless and septate. From the apex of each segment conidia are abstricted, which may infect other larch needles. Whether the germ-tubes affect entry through stomata or by piercing the cuticle is unknown.—*C. R. Tillotson.*

216. Hunt, T. F. **Pythiacystis "brown rot" affecting deciduous trees.** Monthly Bull. Dept. Agric. California 10: 143–145. 1921.—The Pythiacystis rot is distinct from that caused by *Sclerotinia cinerea*. The causal organism lives over in the soil and most of the infection develops on parts of the tree nearest the ground, a small, dark spot on the bark being the first indication. Under favorable weather conditions the disease spreads rapidly over trunk and twig. No definite control measures have been determined. Bordeaux and lime-sulphur sprays together with good drainage are suggested as control measures.—*E. L. Overholser.*

217. Jones, L. R., and Maud Miller Williamson. **Bacterial leaf spot of red clover.** [Abstract.] Phytopathology 11: 50. 1921.

218. Melchers, L. E. **Rhizopus sp. associated with a decay of unripe strawberries in the field.** [Abstract.] Phytopathology 11: 44. 1921.

219. Morris, H. E., and D. B. Swingle. **An important new disease of the cultivated sunflower [Sclerotinia libertiana].** [Abstract.] Phytopathology 11: 50. 1921.

220. Povah, Alfred H. W. **Valsa poplar canker.** [Abstract.] Phytopathology 11: 45. 1921.

221. Rap, C. W. **Bacterial blight of beans.** Oklahoma Agric. Exp. Sta. Bull. 131. *40 p., 17 fig.* 1920.—The history of the disease, its distribution, and importance are reviewed. The methods of infection and distribution of the organism are outlined. It is reported to live over winter on the seed, straw, and in the soil, and to be disseminated by rain, dew, insects, and

dust. Cultural characters of the organism are given. Tests reported show considerable differences in varietal susceptibility. Spraying, seed treatment, and seed selection seemed valueless or impractical as control measures. Three-year old seed gave blight-free plants, as did pod-selected seed. Selection for resistance is considered the most practical method of control.—*John A. Elliott.*

222. Robbins, W. W. **Mosaic of sugar beets.** [Abstract.] Phytopathology 11:48. 1921.

223. Slagg, C. M. **A new seedling disease of tobacco.** [Abstract.] Phytopathology 11:49. 1921.

224. Smith, Erwin F., and G. H. Godfrey. **Bacterial wilt of castor bean (Ricinus communis L.).** Jour. Agric. Res. 21:255–261. *Pl. 55–57.* 1921.—The disease is caused by *Bacterium solanacearum.* It seems to be more prevalent on the alkaline soil of central and west Florida than on the acid soil of the East coast; it is also more prevalent on "new" land than on old. The organism was cultured and infection produced in various known hosts by needle-prick inoculations. Additional hosts are cotton (*Gossypium*), *Vanilla planifolia,* sunflower (*Helianthus annuus*), and *Fuchsia* sp. [See also Bot. Absts. 1, Entry 362.]—*D. Reddick.*

225. Tisdale, W. B., and Maud Miller Williamson. **Bacterial leaf spot of lima bean.** [Abstract.] Phytopathology 11: 52. 1921.

226. Tisdale, W. B. **Two sclerotium diseases of rice.** [Abstract.] Phytopathology 11: 42. 1921.

227. Walker, J. C. **A Macrosporium rot of onion.** [Abstract.] Phytopathology 11: 53. 1921.

ERADICATION AND CONTROL MEASURES

228. Bisby, G. R. **The cooperative potato spraying project.** [Abstract.] Phytopathology 11: 60. 1921.

229. Brock, W. S. **Spraying versus dusting in Illinois.** Proc. Amer. Soc. Hort. Sci. 17: 108–110. 1920 [1921].—The author states that only 1 orchard was dusted in Illinois in 1920 and that none will be dusted in 1921. During the four years of experimental work in Illinois curculio was uniformly controlled in all cases, dusting being superior to spraying. With an average infestation of codling moth for 3 years of 33 per cent on the checks, the average infestation on liquid- and dust-treated trees was 6 and 12 per cent respectively. Dusting has failed to control scab satisfactorily. With a 4-year average of 82 per cent scabby fruit on check trees there was an average infestation of 12 and 41 per cent respectively on sprayed and dusted trees. The author concludes that "there is no experimental evidence to show that dusting with sulphur-arsenate of lead powder will be advisable in Illinois." Extracts were read from communications received from 8 commercial growers in various sections of the state; each grower had discontinued the use of dust. One, however, found it entirely satisfactory for control of curculio, scab, and rot on peaches; another found it effective for the bloom spray on apples, provided the weather was calm; while a third was interested in having further experimental work done with dusting.—*H. W. Richey.*

230. Duddleston, B. H., and G. N. Hoffer. **The improved rag-doll germinator as an aid in controlling root, stalk and ear-rots of corn.** [Abstract.] Phytopathology 11: 33. 1921.

231. Gilman, J. C., and A. T. Erwin. **Greenhouse propagation of cabbage resistant to yellows.** [Abstract.] Phytopathology 11: 54. 1921.

232. Hamblin, C. O. **Treatment of scab in seed potatoes.** Agric. Gaz. New South Wales 32: 417–419. *2 fig.* 1921.

233. Lance, Robert. **Sur l'emploi d'écrans colorés pour combattre les maladies cryptogamiques des végétaux.** [The use of colored screens in the combating of cryptogamic diseases of plants.] Compt. Rend. Acad. Sci. Paris 172: 1201. 1921.—A colored screen permitting blue, violet, and ultraviolet rays to pass is found to be useful in destroying cryptogamic organisms causing diseases of plants, especially those on grapes. A description of the method of making the screen is given. [See also following entry.]—*C. H. Farr.*

234. Lance, Robert. **Sur un produit anticryptogamique.** [Concerning an anticryptogamic substance.] Compt. Rend. Acad. Sci. Paris 172: 1201–1202. 1921.—Toxic effects upon parasitic fungi were obtained with light passed through screens made with zinc chloride or zinc sulphate. [See also preceding entry.]—*C. H. Farr.*

235. Lochhead, W. **The story of spraying mixtures.** Sci. Agric. [Canada] 1: 113–115. 1921.—A concise account is presented of the development of liquid and dust spraying, especially from 1890 to 1920, with mention of the part played by Canadian workers.—*B. T. Dickson.*

236. McClintock, J. A. **The control of peach brown rot and curculio.** [Abstract.] Phytopathology 11: 43. 1921.

237. Mackie, W. W., and Fred N. Briggs. **Chemical dusts for the control of bunt.** Abstract.] Phytopathology 11: 38–39. 1921.

238. Petch, C. E. **Spraying versus dusting.** Sci. Agric. [Canada] 1: 171–172. 1921.—In Quebec orchard dusting has developed rapidly in the past 8 years and has proved as efficient as spraying in controlling apple scab and biting insects. It is not yet possible to say that dusting furnishes an economic control for sucking insects.—*B. T. Dickson.*

239. Porter, R. H. **Cooperative seed treatment using hot formaldehyde.** [Abstract.] Phytopathology 11: 59. 1921.

240. Valleau, W. D. **Resistance as a basis of control of corn root rot.** [Abstract.] Phytopathology 11: 34. 1921.

241. Vaughan, R. E. **Inoculated sulphur for potato scab control.** [Abstract.] Phytopathology 11: 58. 1921.

REGULATORY MEASURES

242. Anonymous. **Erlass des Ministers für Landwirtschaft, Domänen und Forsten über Bekämpfung des Kartoffelkrebses.** [Order of the Minister for Agriculture, Public Lands and Forests relative to the potato wart disease.] Zeitschr. Kartoffelbau 1^7: 59–61. 1921.—Owing to the difficulty of administering wart disease control work during the war and the subsequent occupation of the Rhine province, the disease has continued to spread, and strictest adherence to provisions of the order of February, 1918, is enjoined upon all officials. The order provides for notification of wart infection, destruction of diseased plants, and use of only approved immune varieties.—*F. Weiss.*

MISCELLANEOUS (COGNATE RESEARCHES, TECHNIQUE, ETC.)

243. Burns, G. P. **Tip-burn and the leafhopper.** [Abstract.] Phytopathology 11: 56–57. 1921.

244. G., R. R. [Rev. of: Smith, Erwin F. **An introduction to bacterial diseases of plants.** *xxx + 688 p.* W. B. Saunders Co.: New York and London, 1920 (see Bot. Absts. 7, Entry 1273).] Nature 107: 168. 1921.

245. Johnson, James. **The use of sterilized soils in pathological research.** [Abstract.] Phytopathology 11: 51. 1921.

246. LaRue, Carl D. **Lightning injury to Hevea brasiliensis.** [Abstract.] Phytopathology 11: 46. 1921.

247. Stevens, F. L. **The relation of plant pathology to human welfare.** Amer. Jour. Bot. 8: 315–322. 1921.—The author cites examples of the enormous economic loss caused by plant disease. Plant pathology has aided in the prevention of disease by demonstrating the value of protective applications, sprays and dusts; excision; seed steeps; general sanitation leading to diminution of infective material; breeding for disease resistance; modifications of agricultural practice; and quarantine restrictions. The bulk of our present knowledge is the outcome of scientific investigation, and the future usefulness of the plant pathologist will depend on his vigorous prosecution of fundamental research rather than on a mere administration of protective measures. The author makes a plea for the encouragement of the individual worker and for the unification of all botanical activities.—*E. W. Sinnott.*

248. Vayssière, M. P. **Revue de phytopathologie.** [Phytopathological review.] Rev. Gén. Sci. Pures et Appl. 32: 11–22. 1921.—The writer discusses the advances made in phytopathology and entomology since his previous review in Rev. Gén. Sci. Pures et Appl. in 1918. The work of French investigators on copper fungicides and the effect of varying degrees of acidity and alkalinity on their value is reviewed. The salts of arsenic (other than lead arsenate) have also received considerable attention since his last review. The work along this line is reviewed. The investigations of Vermorel and Dantony (see Bot. Absts. 3, Entry 1200; 7, Entry 1254) and of Bruttini on calcium sulphate or polysulphides of calcium as insecticides and fungicides are reviewed. The utilization of products of the war for combating insects has also received considerable attention by French investigators.—The American investigations of mosaic diseases of plants receives special treatment by the reviewer.—A section of the review is given to the investigations of insect pests.—*H. W. Anderson.*

PHARMACEUTICAL BOTANY AND PHARMACOGNOSY

Heber W. Youngken, *Editor*

E. N. Gathercoal, *Assistant Editor*

(See also in this issue Entries 15, 380)

249. Fick, I. A. R. **The value of lavender.** Amer. Bee Jour. 61: 232–233. 1921.—As it has been stated that 1 acre of lavender (*Lavendula officinalis* var. *vera*) will yield a ton of honey, further information is well worth seeking. Light, dry soils, well supplied with lime and fully exposed to the sun, are best adapted to growing lavender. From 5 to 10 tons of the flowers are bought annually in the U. S. A. by druggists and distillers of perfumes. From an acre, 600–1,200 pounds of fresh blooming tips are obtained; the dry weight is about ⅓ of the green weight. The yield of oil varies from 12 to 15 pounds per acre. During the 1st week in March ordinary lavender flowers sold in the New York wholesale market for 18 to 24 cents per pound; select flowers for 21 to 25. It is desirable to test the plant in the U. S. A., both for the commercial value of its flowers and as a honey producer.—*J. H. Lovell.*

250. Goris, A., et Ch. Vischniac. **Sur les alcaloides de la valériane.** [On the alkaloids of Valeriana.] Compt. Rend. Acad. Sci. Paris 172: 1059–1061. *1 fig.* 1921.—The authors confirm the work of Waliszewski and of Chevalier as to the existence of 2 alkaloids, chatinine and valerine, in the root of valerian.—*C. H. Farr.*

251. Mirande, Marcel. **Sur le lathyrisme ou intoxication provoquée par les graines de Gesses.** [Concerning lathyrism, or intoxication caused by seeds of chickling vetches.] Compt. Rend. Acad. Sci. Paris 172: 1142–1143. 1921.—Intoxication of men and animals is reported as a consequence of eating seeds of certain chickling vetches, namely, *Lathyrus sativus* and *L. Cicera.*—*C. H. Farr.*

PHYSIOLOGY

B. M. Duggar, *Editor*
Carroll W. Dodge, *Assistant Editor*

(See also in this issue Entries 9, 93, 152, 191, 205, 233, 234, 245, 250, 316)

GENERAL

252. B[lackman], V. H. [Rev. of: Onslow, Muriel Wheldale. **Practical plant biochemistry.** *i + 178 p.* Cambridge University Press: 1920 (see Bot. Absts. 8, Entry 602).] New Phytol. 20: 43. 1921.

253. D., C. [Rev. of: Eichwald, E., und A. Fodor. **Die physikalisch-chemischen Grundlagen der Biologie. (The physico-chemical bases of biology.)** *510 p., 119 fig.* J. Springer: Berlin, 1919. *Price, unbound, M. 48.*] Zeitschr. Phys. Chem. 94: 507–508. 1920.—It appears that although the general field of physical chemistry is covered by the book, topics of biological interest are treated at relatively greater length. The reviewer questions the advisability of including a chapter on the infinitesimal calculus, though believing that its usefulness can not be predicted in advance. The whole treatment is considered to be in refreshing contrast to that in the usual text books, and, although vague in places, it is judged a good and useful work.—*H. E. Pulling.*

254. Freundlich, H. [Rev. of: Ostwald, Wo. **Die Welt der vernachlässigten Dimensionen. (The world of neglected dimensions.)** *3rd. ed., 222 p.* Theodor Steinkopf: Dresden and Leipzig, 1919. *Price M. 9.*] Zeitschr. Phys. Chem. 94: 506. 1920.—Although the reviewer disagrees with the author on many points and would place his emphasis differently in many cases, he heartily commends the book. It is stated that while the work is entertainingly written and presents colloid chemistry from an attractive point of view, one misses the information that might properly be expected in an "introduction," which the book purports to be.—*H. E. Pulling.*

255. Harden, A. [Rev. of: Bertrand, G., and P. Thomas. **Practical biological chemistry. Translated from the third edition by H. A. Colwell.** *xxxii + 348 p.* G. Bell and Sons: London, 1920.] Nature 107: 390. 1921.—The reviewer considers this book of much value to students and especially to teachers of biochemistry.—*O. A. Stevens.*

DIFFUSION AND OTHER PHYSICAL PHENOMENA

256. Harris, J. A., R. A. Gortner, and J. V. Lawrence. **On the differentiation of the leaf tissue fluids of ligneous and herbaceous plants with respect to osmotic concentration and electrical conductivity.** Jour. Gen. Physiol. 3: 343–345. 1921.—The osmotic concentration shown by freezing point lowering, Δ, of sap from tissues of ligneous plants is materially higher than that of herbaceous plants. The specific electrical conductivity, K, is materially lower. The ratio $\frac{K}{\Delta}$ is about 90 per cent higher in herbaceous than in ligneous plants. Material from the Arizona desert, the Jamaica rain forest, and Long Island give concordant results.—*E. L. Proebsting.*

257. Loeb, Jacques. **Chemical and physical behavior of casein solutions.** Jour. Gen. Physiol. 3: 547–555. 1921.—Experiments with casein show that, as with gelatin and crystalline egg albumin, the forces determining the combination between proteins and acids or alkalies are the same forces of primary valency which also determine the reaction between crystalloids and acids and alkalies. Valency and not the nature of the ion determines the effect on the physical properties of the protein.—*Otis F. Curtis.*

258. Loeb, Jacques. **Ion series and the physical properties of proteins. 1.** Jour. Gen. Physiol. 3: 85–106. 1920.—The writer has conducted experiments to determine whether the effects of acids and alkalies on proteins (gelatin and egg albumin) as measured by viscosity and osmotic pressure can be explained on the basis of ion series or on a purely chemical basis. The data all indicate that differences previously obtained by other workers and explained as due to differences in ion series are probably due to the fact that rather large and equivalent quantities of acids and alkalies were used rather than low concentrations having the same P_H values. When solutions of protein with the acids HCl, HBr, HNO_3, acetic, monochloracetic, also di- and trichloracetic, succinic, tartaric, citric, and phosphoric were used at the same P_H values and with the same concentrations of originally isoelectric protein there were no differences between the acids in their effects on the osmotic pressure and viscosity of gelatin and on the osmotic pressure of crystalline egg albumin. These protein acid salts all behaved as if the anions were monovalent. H_2SO_4 formed protein salts with dibasic anion and these salts have osmotic pressures and viscosities of only one-half or less that of the protein salts with monovalent anion (protein chloride) at the same P_H values and with the same concentration of originally isoelectric gelatin, while oxalic acid behaves as if most of the anions were monovalent but a few divalent. It was also found that the osmotic pressures and viscosities of the solutions of Li, Na, K, and NH_4 salts of proteins are the same at the same P_H values. $Ca(OH)_2$ and $Ba(OH)_2$ form salts with proteins in which the cations are dibasic, and the osmotic pressures and viscosities of their salts are only one-half or less than half those of salts with monovalent cations at the same P_H values.—*Otis F. Curtis.*

259. Loeb, Jacques. **Ion series and the physical properties of proteins. II.** Jour. Gen. Physiol. 3: 247–269. 1920.—This paper gives additional evidence (see preceding abstract) that the physical properties of proteins, especially hydration, viscosity, and osmotic pressure, are determined by the purely chemical forces of primary valency and not by the ion series of Hofmeister. The relative solubilities of gelatin solutions in alcohol mixtures are in a similar sense independent of ion series. Conductivity measurements of solutions of gelatin salts do not show a definite relation between the physical properties of proteins and changes in degree of ionization.—*Otis F. Curtis.*

260. Loeb, Jacques. **Ion series and the physical properties of proteins. III. The actions of salts in low concentration.** Jour. Gen. Physiol. 3: 391–414. 1921. (See also the 2 preceding abstracts.)—Ions with sign of charge opposite to that of a protein ion diminish the swelling, osmotic pressure, and viscosity of the protein solution, while ions with the same sign of charge as the protein ion, excepting H and OH ions, seem to have no effect on the phenomena mentioned so long as the concentration of the electrolytes does not exceed about M/16. The relative depressing effects of different ions on the physical properties are functions of the valency and of the sign of charge of the ions; and those ions of the same sign of charge and of the same valency have practically the same depressing effects on gelatin solutions of the same P_H. The depressing effect increases rapidly with an increase in valency. The Hofmeister ion series is explained as an error due to a failure to recognize the influence of the addition of various salts on the hydrogen ion concentration of the solution.—*Otis F. Curtis.*

261. Loeb, Jacques. **The colloidal behavior of proteins.** Jour. Gen. Physiol. 3: 557–564. 1921.—The writer has applied the Donan equilibrium,—which supposes that one of the ions in solution can not move through a membrane while another may,—to the colloidal behavior of proteins showing that curves presenting potential differences (*P.D.*) as a function of the hydrogen ion concentration resemble those for osmotic pressure, and that these *P.D.* and, therefore, the physical properties of protein solutions, can be predicted from the differences between the P_H of the solutions inside and outside of the membrane on the basis of the Nernst formula $E = \frac{RT}{nF} \ln \frac{C_1}{C_2}$ if it is assumed that the *P.D.* are due to differences in the hydrogen ion concentrations on the 2 sides of the membrane.—*Otis F. Curtis.*

262. Mellon, R. R., S. F. Acree, P. M. Avery, and E. A. Slagle. **The ionization constants of glycerophosphoric acid and their use as buffers, especially in culture mediums.** Jour. Infect. Diseases 29: 1–6. 1921.—The precipitation of phosphates in culture media on the alkaline side of neutrality can be prevented by the use of disodium glycerophosphate. This salt being a solvent for calcium and magnesium salts can also be used in the washing of agar, in the precipitation of casein, and for the study of the effect of calcium and magnesium ions on the growth of various organisms. The ionization constants of the glycerophosphates are about the same as those of the ordinary phosphates; the former can, therefore, be substituted as buffers.—*Selman A. Waksman.*

263. Priestley, J. H. **The mechanism of root pressure.** New Phytol. 19: 189–200. *Fig. 1–8.* 1920.—The attempt is made to interpret data presented by others bearing on the mechanism of root pressure. An osmotic gradient exists cell by cell from the root hair to the xylem duct. The resultant entrance of water into the parenchyma within the endodermis causes the development of a considerable hydrostatic pressure within the vascular cylinder, since the endodermis is unable to expand because of the lignification of its radial walls. Moreover, it does not permit the passage of water except by osmosis through its protoplasts. The assumption is made that increased permeability of the protoplasm of the parenchyma cells adjoining ducts allows this hydrostatic pressure to force water and solutes into the ducts.—Certain objections to the theory are considered.—*I. F. Lewis.*

WATER RELATIONS

264. MacDougal, D. T. **Water deficit and the action of vitamines, amino-compounds and salts on hydration.** Amer. Jour. Bot. 8: 296–302. 1921.—The author suggests that plant protoplasm is a colloidal mixture of 2 separate but interwoven aggregates, the proteins and the pentosans, with soap films enclosing the more solid phase of the double meshwork. The separate elements in this albumin-pentosan-soap structure differ in their capacity for hydration and in the conditions under which hydration may occur within them. The metals represented by the usual nutrient salts are found to increase the hydration capacity of the principal components of biocolloids. The presence of a small amount of soap in a biocolloid increases its hydration capacity, but this capacity is much lessened by even a very dilute acid. Yeast vitamine (water-soluble B) in a solution slightly acid, increases the hydration in some living and dead plant cell masses and lessens it in others; similar diverse action on biocolloids was found. All of the substances tested which are known to facilitate growth in plants are found to increase hydration capacity in some of the test objects.—*E. W. Sinnott.*

265. Weiser, H. B., and E. E. Porter. **Spontaneous evaporation.** Jour. Phys. Chem. 24: 233–341. 1920.—Careful repetition of experiments by Babington (see Proc. Roy. Soc. London 10: 132. 1859), which led the latter to conclude that some salts when dissolved in water accelerate evaporation of the water, showed that these salts actually retard evaporation and indicated that Babington's error was chiefly owing to an increase in surface produced by a creeping of the solution, although failure to maintain constant conditions contributed to the error. The authors found the use of a rotating table necessary to obtain concordant results.—*H. E. Pulling.*

PHOTOSYNTHESIS

266. Anonymous. **De koolzuirassimilatie in verband met de bemesting.** [Carbon dioxide assimilation in connection with manuring.] Cultura 33: 110–117. 1921.—A general outline is given of the work of Blackman, Willstätter, Stoll, Klein, Reinau, Bornemann, and others.—*J. C. Th. Uphof.*

METABOLISM (GENERAL)

267. Blackman, F. F. **The biochemistry of carbohydrate production in the higher plants from the point of view of systematic relationship.** New Phytol. 20: 2–9. 1921.—Carbohydrate production is analyzed into 3 strata: (1) The primary photo-reduction of carbonic acid

involving light-energy and specific pigments; (2) the immediate appearance of sugars, which seems to be universal; (3) the subsequent appearance, though by no means universally, of complex polysaccharides, which are deposited in the chloroplasts.—The author discusses the 2nd and 3rd strata. Consideration is given to the work of Nef on the spontaneous chemical changes undergone by sugars in the presence of impurities as bearing on the fact that plant sugars tend to take the form of hexoses, or less often pentoses. The relation between succulence and the production of pentoses is discussed.—The high critical sugar-concentration of monocotyledons and the low concentration of the diocotyledons, while general, are ranked with those morphological characters of secondary and tertiary importance in their classificatory value because of exceptions.—The work of Reichert on the starch grain is reviewed.—The uniformity of the chlorophyll pigments is contrasted with the diversity of the starches.—*I. F. Lewis.*

268. Davis, D. J. **Food accessory factors in bacterial growth. III. Further observations on the growth of Pfeiffer's bacillus (B. influenzae). IV. The "satellite" or symbiosis phenomenon of Pfeiffer's bacillus (B. influenzae). V. The value of the satellite (or symbiosis) phenomenon for the classification of hemophilic bacteria.** Jour. Infect. Diseases 29: 171–189. 1921.—The growth requirement of *B. influenzae* may be represented by a plain medium plus a heat-resistant substance (hematin or derivative) plus a heat-labile substance. In the blood the heat-resistant and the heat-labile substances are present, but the latter is destroyed by heating in the autoclave (120°C.) for a few minutes or at lower temperatures for longer periods. The heat-labile substance can be obtained from plant, animal, and bacterial extracts, none of which by themselves support a growth of *B. influenzae.*—Profuse growth of *B. influenzae* occurs immediately around colonies of organisms or pieces of plant or animal tissue. The product of bacteria, of fungi, of tissues, etc., which stimulates the growth of the organism is thermolabile and stimulates growth in conjunction with hematin or with hemoglobin. This is a phenomenon of "satellitism" (symbiosis) and is of value in identifying and in classifying members of the hemophilic group.—*Selman A. Waksman.*

269. Dupont, Georges. **Contribution à l'étude des constituants acides de la gemme du pin maritime. Isomerisation des acides pimariques. [The constitutent acids of the leaf buds of the maritime pine. The isomerization of pimaric acid.]** Compt. Rend. Acad. Sci. Paris 172: 1373–1375. 1921.—Heat, acetic acid, and hydrochloric acid are found to isomerize laevo- and dextro-pimaric acids. Laevo pimaric acid is changed into α pimarabietic acid, which is later changed into β pimarabietic acid.—*C. H. Farr.*

270. Jonesco, Stan. **Contribution a l'étude du rôle physiologique des anthocyanes. [A study of the physiological rôle of the anthocyans.]** Compt. Rend. Acad. Sci. Paris 172: 1311–1313. 1921.—It is found that plants lose anthocyan in the dark. Upon analysis there proves to be a conversion of the anthocyan into anthocyanic glucosides, which are in turn changed into flavonic glucosides. These latter also disappear in darkness. It is therefore concluded that the anthocyans are utilized in the nutrition of the plant when in darkness. To the theory of Pringsheim, that these pigments protect the chlorophyll against too strong illumination; to that of Stahl, that they facilitate the rise of temperature in the plant; and to that of Palladin, that they are involved in respiration, these findings are thought to add an additional explanation of their physiological significance.—*C. H. Farr.*

271. Latham, R. O. **The colour of primrose flowers.** Nature 107: 301. 1921.—The author inquires the cause of the red color in flowers normally pale yellow. It is considered to be due to an anthocyan pigment, not present in normal flowers, produced by reduction from the normal sap pigments, the cause of the reaction being unknown.—*O. A. Stevens.*

272. Patty, F. A. **The production of hydrocyanic acid by Bacillus pyocyaneus.** Jour. Infect. Diseases 29: 73–77. 1921.—Different strains of *B. pyocyaneus* produce varying quantities of HCN when grown in whole egg broth or even synthetic media, the optimum reaction being P_H 5.4–5.8. This is an aerobic phenomenon and is not produced by an extracellular enzyme.—*Selman A. Waksman.*

273. Priestley, J. H. **Suberin and cutin.** New Phytol. 20: 17–29. 1921.—This is a review and summary of certain work on the macro- and microchemistry of suberin and cutin.—*I. F. Lewis.*

274. Samec, et Anka Mayer. **Sur la substance organique fondamentale de l'amylopectine. [The fundamental constituent of amylopectin.]** Compt. Rend. Acad. Sci. Paris 172: 1079–1082. 1921.—Various reactions of amylopectin are given, following out the work of Maquenne on the amyloses. Amylopectin is considered to be formed from certain of the amyloses by union with polybasic acids.—*C. H. Farr.*

275. Zoller, H. F., and W. M. Clark. **The production of volatile fatty acids by bacteria of the dysentery group.** Jour. Gen. Physiol. 3: 325–330. 1921.—These studies show: (1) In the presence of 1 per cent glucose and under aerobic conditions a close agreement exists among the organisms studied in the total quantity of volatile fatty acids produced and in the ratio of formic to acetic acid. (2) On peptone under aerobic conditions, volatile fatty acids are produced in appreciable quantities, although the reaction of the solution becomes more alkaline. There is no formic acid, but propionic and acetic acids are found. (3) On peptone under anaerobic conditions, formic, acetic, and butyric acids are produced. The reaction is more acid than in (2). (4) On glucose under anaerobic conditions, the results are similar to those under aerobic conditions. (5) The enormous quantity of formic acid produced by these bacteria may play a significant part in the digestive disturbances and in the symptoms of intoxication accompanying the infection of the human intestinal tract by such forms.—*E. L. Proebsting.*

METABOLISM (NITROGEN RELATIONS)

276. Kayser, E. **Influence des sels d'urane sur le fixateur d'azote. [The influence of uranium salts on the fixation of nitrogen.]** Compt. Rend. Acad. Sci. Paris 172: 1133–1134. 1921.—With mannite as an organic nutrient, uranium salts are found in general to have an injurious effect on the fixation of nitrogen by *Azotobacter chroococcum*. Uranium acetate (1:6,000) is an exception. With glucose media uranium acetate (1:15,000) increases nitrogen fixation.—*C. H. Farr.*

277. Kayser, E. **Recherches sur l'Azotobacter. [Investigations on Azotobacter.]** Compt. Rend. Acad. Sci. Paris 172: 939–940. 1921.—A study of the effect of color on the fixation of nitrogen by *Azotobacter* is reported. Yellow and blue colors were compared, mannite was used as food, and 2 successive periods of 13 days each marked the extent of the study. No striking differences in the effects of the colors were secured.—*C. H. Farr.*

METABOLISM (ENZYMES, FERMENTATION)

278. Bourquelot, Em., et Bridel. **Application de la méthode biochimique de recherche du glucose a l'etude des produits de l'hydrolyse fermentaire de l'inuline. [Application of the biochemical method of research on glucose to the study of the products of hydrolysis of inulin by fermentation.]** Compt. Rend. Acad. Sci. Paris 172 : 946–949. 1921.—The hydrolysis of the inulin of *Atractylis* by the inulase of *Aspergillus niger* gives reduction products which have the rotatory power of *d* fructose. These products do not combine with methyl alcohol under the influence of emulsin. If glucose is added to the solution a combination with methyl alcohol is effected, therefore the reduction would not seem to yield glucose but methyl-glucoside β.—*C. H. Farr.*

279. Hammarsten, Harald. **Aldolkondensation und Harzbildung bei Einwirkung von verdünnten Alkalien auf Acetaldehyd. [Aldol condensation and resin formation by the action of dilute alkalies upon acetaldehyde.]** Ann. Chem. [Liebig] 421: 293–315. 1920.

280. Koser, S. A. **Trehalose fermentation in the differentiation of the paratyphoid-enteritidis group.** Jour. Infect. Diseases 29: 67–72. 1921.—*Bacillus suipestifer* is unable to

attack trehalose, while *B. paratyphosus*, *B. Schottmulleri*, the animal para B sub-group, and *B. enteritidis* ferment trehalose with the production of acid and gas. A further differentiation of *B. Schottmulleri* strains from the animal para B group is accomplished by employing a serum water medium containing 0.5 per cent trehalose and 1 per cent Andradé indicator.—*Selman A. Waksman.*

281. Mirande, Marcel. **Sur les graines à autofermentation sulfhydrique de la famille des Papilionacées. [Hydrogen sulphide autofermentation of seeds of the Papilionaceae.]** Compt. Rend. Acad. Sci. Paris **172**: 1202–1204. 1921.—Seeds of certain legumes are found to undergo auto-fermentation when placed in a little water, splitting off active H_2S. More than 9 species are named which produce much H_2S, 9 are given which produce only a little, and 5 which do not produce it at all. There is also a discussion of the fermentation capacity in the flour of these legumes, in bread made in part from such flour, and in soup preparations.—*C. H. Farr.*

282. Northrop, John H. **The significance of the hydrogen ion concentration for the digestion of proteins by pepsin.** Jour. Gen. Physiol. **3**: 211–227. 1920.—The writer suggests that proteins are acted upon by pepsin only when they are in the ionized condition. Evidence in support of this is given as follows: (1) Curves for the rate of digestion of the proteins, oxyhemoglobin, egg albumin, and gelatin run parallel to the conductivities of the solutions when these are both plotted against the P_H values. (2) The decrease in the rate of digestion induced by an excess of HCl above the optimum is duplicated by the addition of an excess of this same Cl ion in equivalent concentrations when in combination with 6 different cations. (3) Oxyhemoglobin, with its isoelectric point at about P_H 6.8, is more highly ionized at P_H 4.5 than are other proteins with isoelectric points at more nearly P_H 4.5, and it is also more rapidly digested at this hydrogen ion concentration.—*Otis F. Curtis.*

283. Pease, R. N., and H. S. Taylor. **Promotor action in catalysis.** Jour. Phys. Chem. **24**: 240–265. 1920.—Promotor action is to be distinguished from activation ("by a substance relatively inert catalytically, or by a small quantity of a relatively active substance") and from co-activation ("of a number of catalysts each by the rest") in that it includes "all those cases in which a mixture of two or more substances is capable of producing a greater catalytic effect than can be accounted for on the supposition that each substance in the mixture acts independently and in proportion to the amount present." Examples of each type are given and these include actions of enzymes and co-enzymes as well as various technical catalytic processes.—*H. E. Pulling.*

284. Potter, M. C. **The influence of electric potential upon the velocity of fermentation.** Proc. Univ. Durham Phil. Soc. **6**: 16–21. 1915–1920.—In a previous paper the author showed that a rise of potential amounting to as much as .3–.5 volt is produced by yeast growing in a fermentable liquid. In order to determine the influence of the difference of potential on the velocity of reaction, the author compared the rate of fermentation of glucose by yeast in a flask carefully insulated, or raised to a definite potential, with that in a similar flask in which the glucose was grounded. No difference in the rate of fermentation was observed.—*J. S. Cooley.*

285. Willstätter, Richard. **IV. Über Peroxydase. [Concerning peroxidase.]** Ann. Chem. [Liebig] **422**: 47–73. 1921.—The peroxidase value is the purpurogallin number of 5 gr. of plant tissue. This number designates the number of mgr. of purpurogallin formed by the reaction during 5 minutes between 1 mgr. enzyme-containing plant tissue, 5 gr. pyrogallol, and 50 mgr. hydrogen peroxide, in a volume of 2 l. at 20°C. The peroxidase value of fresh roots of horseradish varied from 800 to 1520. The use of toluol, or aspiration with oxygen, during the extraction of the tissue greatly reduced the peroxidase value. Dialyzing for several days this value increases, as is especially true of the soluble form of peroxidase. The insolubility of the peroxidase suggests a chemical combination within the cell, but it is not made soluble by either barium hydroxide or oxalic acid. The use of oxalic acid was found to permit

the dialysis of tissue with little loss of enzyme. This effect is ascribed to adsorption, following a change in the reaction of the proteins to which the enzyme had been bound. The use of dipotassium citrate as a buffer in determining the peroxidase value retarded the formation of purpurogallin. A raw preparation was made by coarse maceration, dialysis for 8 days, treatment with oxalic acid, the addition of barium hydroxide in alcohol, neutralizing with carbon dioxide, and centrifuging. In the solution, bichloride of mercury precipitated a basic glucoside and freed peroxidase; this enzyme is amphoteric. It is adsorbed by a variety of agents, aluminium hydroxide being best. A limited ratio of this substance adsorbed 80 per cent of peroxidase in ½ hour from a 0.05 per cent solution of enzyme in dilute alcohol. Carbon dioxide favors elution (diffusion of enzyme from adsorption medium to solvent), the process having little temperature effect, and reaching an equilibrium in about 1 hour. Protocols show the method of adsorption of enzyme to be much superior to that of adsorption of impurities. By the best method evolved, 5 kgr. of roots (presumably horseradish) gave a yield of 0.31 gr. of the enzyme preparation with a purpurogallin number of 860.—*W. E. Tottingham.*

METABOLISM (RESPIRATION)

286. Bailey, C. H. **The storage of wheat.** Operative Miller 24: 352, 381–382. *Fig. 1–4.* 1919; 25: 5–6. *Fig. 5–7.* 1920.—Heating of grain in storage is caused by respiration, which experiments indicate to be about 20 times as great in the embryo as in the endosperm. Determination of the CO_2 produced by lots of plump, hard spring wheat stored at 100°F. for 4 days at known varying moisture contents, showed a steady increase in heat as the moisture was increased from 12 to 14.5 per cent, and a very rapid rise thereafter. Twice as much heat developed at 15 per cent as at 12.5 per cent, while more than 5 times as much developed at 16 per cent. At a moisture content of 13 per cent there was little difference between hard spring and soft wheats in the amount of heat produced, but at a moisture content of 13.6–13.8 per cent the soft wheats produced as much heat as hard spring wheat at 14.5 per cent. Shrunken wheat, having a bushel weight of 47.5 pounds, produced as much heat at 12.8 per cent moisture content as did plump hard spring wheat at 14.5 per cent. The weight per kernel of the shrunken wheat was less than half that of the normal wheat so that the proportion of embryo was much larger. Frosted wheat kernels also respired much more rapidly than sound wheat, due in part to the greater sugar content.—The respiration of wheat increased with increase in the period of damp storage. Wheat stored at room temperature respired more vigorously than wheat stored at a temperature slightly above freezing. Respiration increased steadily with rise of temperature from 35°C. up to 55°C., after which it steadily diminished. Respiration diminished as the quantity of accumulated CO_2 increased.—*Carleton R. Ball.*

287. Brooks, Matilda M. **Comparative studies on respiration. XIV. Antagonistic action of lanthanum as related to respiration.** Jour. Gen. Physiol. 3: 337–342. 1921.—Concentrations of $La(NO_3)_3$ weaker than 0.0000025M have little effect on the respiration of *Bacillus subtilis* as measured by the production of CO_2 according to the Osterhout method. At 0.000006M there is an increase in the rate while at concentrations above 0.000025M there is increasing retardation. Distinct antagonistic effects between $La(NO_3)_3$ and NaCl are evident from respiration measurements while only slight antagonism is evident between $La(NO_3)_3$ and $CaCl_2$.—*Otis F. Curtis.*

288. Brooks, Matilda M. **Comparative studies on respiration. XV. The effect of bile salts and of saponin upon respiration.** Jour. Gen. Physiol 3: 527–532. 1921.—The addition of sodium taurocholate produces an increase in the rate of respiration of *Bacillus subtilis* at a concentration of about 0.0000125M and decreases the rate at higher concentrations. Antagonism was found between NaCl and sodium taurocholate as measured by respiration. Solutions of saponin at concentrations between 0.00005M and 0.001M retarded respiration while at lower concentrations no effect was noticeable.—*Otis F. Curtis.*

289. Gustafson, F. G. **Comparative studies on respiration. XII. A comparison of the production of carbon dioxide by Penicillium and by a solution of dextrose and hydrogen peroxide.**

Jour. Gen. Physiol. 3: 35–39. 1920.—A neutral solution of dextrose and hydrogen peroxide acts like *Penicillium chrysogenum* in producing an increased amount of CO_2 upon the addition of acid, but not upon the addition of alkali.—*Author's summary.*

290. INMAN, O. L. **Comparative studies on respiration. XVI. Effects of hypotonic and hypertonic solutions upon respiration.** Jour. Gen. Physiol. 3: 533–537. 1921.—In highly hypertonic solutions of sea water the rate of respiration of *Laminaria Agardhii* is very much reduced as measured by CO_2 production according to the Osterhout method. In highly hypotonic solutions the rate is also reduced, but less markedly. Hypertonic solutions of NaCl, $CaCl_2$, and mixtures of the 2 in the proportion 50 : 1 caused a decrease in the respiration of wheat seedlings.—*Otis F. Curtis.*

291. IRWIN, MARION. **Comparative studies on respiration. XIII. An apparatus for measuring the production of minute quantities of carbon dioxide by organisms.** Jour. Gen. Physiol. 3: 203–206. 1920.

292. ITANO, A., AND J. NEILL. **A microscopic method for anaerobic cultivation.** Jour. Infect. Diseases 29: 78–81. 1921.—There is described a modification of the usual moist chamber preparation, whereby anaerobiosis is obtained by the absorption of oxygen by alkaline pyrogallate.—*Selman A. Waksman.*

293. NICHOLS, H. J. **The production of CO_2 by the typhoid bacillus and the mechanism of the Russell double sugar tube.** Jour. Infect. Diseases 29: 82–85. 1921.—The typhoid bacillus produces CO_2 in significant amounts both from sugars and from proteins.—*Selman A. Waksman.*

GROWTH, DEVELOPMENT, REPRODUCTION

294. LUYTEN, IDA. **De Periodiciteit van de Knopontwikkeling bij den Pruim.** [On the periodicity of bud development in the plum.] Mededeel. Landbouwhoogeschool Wageningen 18: 103–148. *Pl. 2, fig. 9.* 1921.—Bud development was studied with the varieties Drap d'Or d'Esperen and Reine Claude. With the flower buds, a bud-scale and a flower-forming period were distinguished. In May and June, 1919, the growing point of the flower buds produced scales. About July 1, the growing point initiated the formation of the flower, and after July 23 the formation of the different parts of the flower proceeded at a fairly rapid rate. Soon after the bracts were separated from the remaining flower primordia the calyx was differentiated, each flower lying in the axil of a bract. Next, the petal primordia were formed. On August 29 the stamens began to appear, followed by indications of the carpel. The greatest change in the carpel took place about September 20. After October no further external changes occurred until about the middle of January, when growth slowly began.—With the foliage leaves still in the bud, the origin of the buds of the following year became visible as naked growing points. The earliest date at which the growing point in the axil of the leaf could be observed was August 13.—*J. C. Th. Uphof.*

295. VERSLUYS, MARTHA C. **De Periodiciteit van de Knopontwikkeling bij den Kers.** [Periodicity and bud development in the cherry.] Mededeel. Landbouwhoogeschool Wageningen 18: 149–191. *Pl. 2, fig. 10.* 1921.—Flower formation was the chief object of this study, made upon certain varieties of cherry as follows: Bruine Waalsche (Brown Wallon), Abbesse do Mouland, and Hedelfinger Riesenkirsche. In the last named variety, especially, the terminal bud usually produces a long shoot, whereas lateral leaf buds produce either short shoots or longer ones effecting ramification.—In the middle of May, 1919, the flower buds for the next season which had formed in the axils of the lowest leaves on a short shoot, exhibited on the average 7–8 scales. On July 3 this number had increased to 17, and on July 30 to about 26. On August 25 petals of the flower were clearly visible, the receptacle was flat, and the stamens were very vague. On September 23 the sepals touched each other; the petals were broader and flatter; the stamens, appearing in 4 whorls of usually 10 each, already showed a differentiation into anther sacs; and the carpel had become elevated, with the cones already

in close contact. On October 12 the ovary, style, and stigma were practically complete, and in this state the flower entered the winter, during which season no important changes took place.—*J. C. Th. Uphof.*

296. West, C., G. E. Briggs, and F. Kidd. **Methods and significant relations in the quantitative analysis of plant growth** New Phytol. 19: 200–207. 1920.—Suggestions are offered for a method of quantitative analysis of plant growth week by week. For such an analysis the primary data are "measurements of dry-weight and leaf area at intervals of a week or less accompanied by measurements of respiration, assimilation, transpiration and chemical analysis of the plant tissue, and continuous records of the various environmental factors likely to affect growth." The significant secondary relations may be expressed through 4 series of numbers, which can be put in the form of graphs,—*relative growth rate, leaf area rates, unit leaf rate,* and *relative leaf growth rate.* Definitions and formulae are given for these.—*I. F. Lewis.*

MOVEMENTS OF GROWTH AND TURGOR CHANGES

297. Bibb, L. B. **Summation of dissimilar stimuli applied to leaflets of sensitive brier (Schrankia).** Jour. Gen. Physiol. 3: 523–526. 1921.—In the morning the closure of 1 leaflet of *Schrankia uncinata* Willd. does not result in the closure of the next distal leaflet, while in the afternoon such closure will inaugurate a wave of closures of the distal leaflets in turn. It was found that, at a time of day when the closure of 1 leaflet would not normally cause the closure of the others, an exposure of the pinnae to chlorine or ammonia gas would so sensitize them that all of the leaflets would close in turn when 1 was touched. This is taken as a demonstration of the summation of dissimilar stimuli.—*Otis F. Curtis.*

298. Small, J. **Preliminary note on a hydrion differentiation theory of heliotropism.** New Phytol. 19: 275–276. 1920.—The possibility is suggested that the direction of heliotropic curvatures is governed by the hydrion concentration of the continuous phase of the plasma membranes of the perceptive cells.—*I. F. Lewis.*

299. Small, J. **Preliminary notes on additional evidence for the hydrion differentiation theory of geotropism. III. A theory of the origin of leaves.** New Phytol. 19: 210–212. *Fig. 1–3.* 1920.—Analogies are suggested between the zones of potential differences in the stem and its lateral organs and the lines of force of certain magnetic fields.—*I. F. Lewis.*

300. Small, J., and M. W. Lea. **Preliminary notes on additional evidence for the hydrion differentiation theory of geotropism. I. On the reversal of geotropic curvature in the stem.** New Phytol. 19: 208–209. 1920.—In most cases, when shoots of different plants are coated with vaseline and placed horizontally in the dark, they curve downward. The reversal of the geotropic response is due to the accumulation of CO_2 within the tissues.—*I. F. Lewis.*

301. Small, J., and M. J. Lynn. **Preliminary notes on additional evidence for the hydrion differentiation theory of geotropism. II. On the angle of balance in roots, stems and leaves.** New Phytol. 19: 209–210. 1920.—Announcement is made that the angle at the junction of a lateral organ (root, stem, or leaf) with the main axis varies directly with the length of the lateral, (L), and inversely as the distance to the tip of the main axis, (D). The fraction $\frac{L}{D}$ varies as the sine of the angle.—*I. F. Lewis.*

REGENERATION, CORRELATION

302. Child, C. M. **Certain aspects of the problem of physiological correlation.** Amer. Jour. Bot. 8: 286–295. 1921.—The author describes briefly the existence in animals of physiological or metabolic gradients from a dominant apical region to a subordinate basal one and shows that the localization and differentiation of organs and parts occur in a definite relation to this gradient and are determined by it. The range of dominance of the apical region of such a gradient is usually limited, and regions beyond this range become physiologically

isolated. The author believes that this relation of dominance and subordination is not a matter of chemical or transportative correlation but is due to the transmission of an excitation through the living protoplasm. It is possible to produce such gradients by exposing undifferentiated cells to localized external stimuli. He discusses the electro-chemical conception of the transmission of excitations proposed by R. S. Lillie. Among plants the author has worked with *Bryophyllum calycinum*, *Phaseolus multiflorus*, and *Saxifraga sarmentosa*. By cooling a zone of the petiole or stem he succeeded in preventing the dominance of the apical region over parts below the cooled portion without interrupting the upward flow of liquids through it. These experiments provide further evidence that in plants the correlative factor is not a transported substance but a transmitted excitation.—*E. W. Sinnott.*

TEMPERATURE RELATIONS

303. Appleman, Charles O., and S. V. Eaton. **Evaluation of climatic temperature efficiency for the ripening processes in sweet corn.** Jour. Agric. Res. 20: 795–805. 1921.—An ear of sweet corn is considered ripe when the growth of kernels ceases and the chemical changes in the corn have nearly attained equilibrium positions. The maturing of ears consists essentially in the loss of water. The important change in percentage composition of corn during ripening consists in the depletion of sugar and the increase of starch. In early stages of ripening, reducing sugars predominate so that the highest total sugar content may not represent the stage of greatest sweetness. On a dry weight basis, the changes in fat, crude fiber, and total nitrogen occur in the very early stages of ripening, and subsequently they remain fairly constant. Consequently, the rate at which the ratio of total sugar to starch decreases is a good measure of the ripening date. Temperature is the controlling factor for the rate of ripening. Several temperature indices were employed to evaluate climatic temperature efficiency for the ripening process, but exponential indices were found to furnish the best criteria. The rate of ripening in sweet corn, for a wide range of temperature, adheres rather strictly to the van't Hoff-Arrhenius principle, and as this rate is inversely proportional to the exponential indices a basis is furnished for prediction within 1 day of the number of days required in different localities and at different seasons in the same locality for sweet corn to pass from the beginning of kernel formation to the best edible stage, as well as the number of days that the corn may be expected to remain in this condition.—*D. Reddick.*

304. Esty, J. R., and P. H. Cathcart. **The change in the hydrogen-ion concentration of various mediums during heating in soft and pyrex glass tubes.** Jour. Infect. Diseases 29: 29–39. 1921.—In thermal death point determinations, the hydrogen-ion concentration of the solution must be known during the entire period of heating. The type of glass to be used for this purpose is important, since heating the solution in the glass greatly affects the hydrogen-ion concentration, particularly when soft glass tubes are used. In the case of juices from canned corn, peas, string beans, spinach, beets, sweet potatoes, and pumpkin, the hydrogen-ion concentration is less affected by soft glass tubes than by hard glass.—*Selman A. Waksman.*

305. Fawcett, Howard S. **The temperature relations of growth in certain parasitic fungi.** Univ. California Publ. Agric. Sci. 4: 183–232. *Fig. 1–11.* 1921.—This is a study of vegetative growth of *Phytophthora terrestria*, *Phomopsis Citri*, *Pythiacystis citrophthora*, and *Diplodia natalensis* at maintained temperatures. Careful consideration was given to: (a) The nature of the organism (the previous history of the fungus), (b) the nature of the medium, (c) temperature conditions, (d) radiation conditions, and (e) the duration condition. The observations were based on the diameter increments of the mycelial disk as it grew over the surface of a corn-meal agar plate. The diameter increments were considered as rates, expressed in millimeters per 24 hours.—In general form and shape the growth-temperature curves of the 4 fungi studied were much alike in the second 24-hour period. Beginning with the lowest temperature tested, the curves all rise gradually to maximum values, then descend rapidly to minima as the highest temperatures permitting growth were approached. However, the growth-temperature curves for each organism show characteristic differences in subsequent 24-hour periods. The apparent temperature optimum and maximum were lower at each successive

24-hour period of observation. A comparison of the growth-temperature graphs of the 4 fungi for the second 24-hour period shows that the total ranges of temperature within which growth rate values are $\frac{1}{10}$ or more of the maximum rate includes from 32.5 to 37°C. of the temperature scale. Of this range, 70–80 per cent is below the optimum temperature for growth.—At the lower temperatures the growth rate increased with the age of cultures throughout the culture period, but the reverse change occurred in cultures at the highest temperatures maintained.—The value of $Q10$, the temperature coefficient for growth, was greatest for the lowest temperatures used and regularly decreased toward the highest temperatures. The value of the temperature coefficient was always largest for the first 24-hour period after inoculation and, as a rule, diminished as time increased. Since the value of $Q10$ decreases in value from infinity to zero, there must be some point at which its value is unity. This point will lie at the middle of a range within which the optimum temperature will be found. For temperature values below this range the values of $Q10$ will be greater than unity, for higher temperatures, less than unity. The use of the coefficient-temperature graphs furnishes a direct method of comparing the growth-temperature relations of different organisms, no matter in what units the rates have been expressed.—*H. S. Reed.*

TOXIC ACTION

306. Molliard, Marin. **Influence du chlorure de sodium sur le développement du Sterigmatocystis nigra. [The influence of sodium chloride on the development of Sterigmatocystis nigra.]** Compt. Rend. Acad. Sci. Paris 172: 1118–1120. 1921.—This fungus was grown in culture media to which various percentages of sodium chloride were added. It is found that a solution of NaCl as low as 1 per cent retards the formation of conidia and reduces the number of conidia formed, and that no conidia are formed in a solution stronger than 3 per cent. The rate of growth is diminished in a solution of 2–5 per cent NaCl, it becomes very slow in a 10 per cent solution, and ceases in 12 per cent. Many data are given to show that within certain limits the ratio of increase in weight of the fungus to the amount of sugar consumed decreases with an increase in concentration of HCl, that is, the amount of sugar consumed is fairly constant though the increase in weight is decreased. It was demonstrated that the suppression of conidia was due to the formation of free HNO_3 in the higher concentrations of NaCl.—*C. H. Farr.*

307. Sartory, A., et P. Bailly. **Du pouvior agglutinant du sulfate de thorium sur les spores d'Aspergillus fumigatus Fr. [The agglutinating power of the spores of Aspergillus fumigatus in the presence of thorium sulphate.]** Compt. Rend. Acad. Sci. Paris 172: 1257–1258. 1921.—The maximum effect is secured in a concentration of from 1:1000 to 1:2000. It is very strong between 1:400 and 1:1000, very weak below 1:200 or above 1:10,000, and is absent in very concentrated solutions.—*C. H. Farr.*

ELECTRICITY AND MECHANICAL AGENTS

308. Halban. [Rev. of: Keller, Rudolf. **Neue Versuche über mikroskopischen Elektrizitätsnachweis. (Recent reseaches on the microscopical demonstration of electricity.)** *120 p.* Wilhelm Braumüller: Wien and Leipzig, 1919.] Zeitschr. Phys. Chem. 94: 509. 1920.—For a long time the author has been investigating vital staining with animal dyes and inorganic precipitates. Conclusions, supported by electrical measurements, on the original potential differences in living tissues are drawn from this work. Besides these experimental investigations the author includes, it is reported, totally unrelated theoretical discussions, such as the uselessness of the concept of unordered motion in the kinetic theory of matter.—*H. E. Pulling.*

309. Lillie, Ralph S. **The rccovery of transmissivity in passive iron wires as a model of recovery processes in irritable living systems. Part I and II.** Jour. Gen. Physiol. 3: 107–128, 129–143. 1920.

PHYSIOLOGY OF DISEASE

310. LUMIÈRE, AUGUSTE, ET HENRI COUTURIER. **L'anaphylaxie chez les végétaux.** [**Anaphylaxis in plants.**] Compt. Rend. Acad. Sci. Paris 172: 1313–1315. *Fig. 1–3.* 1921.—Three experiments were made: (1) Of 4 leaves of equal size on a wild sorrel plant 2 were injected with 0.01 cc. horse serum. Observing no difference after 1 month, the same 2 leaves were reinjected and also 1 of the control leaves treated with 0.3 cc. serum. The reinjected leaves succumbed within 5 days. (2) Of 3 hyacinths growing in the same pot 2 were injected with 0.02 cc. horse serum, and as these remained healthy for 3 weeks, the control bulb and 1 of those previously treated were given each a dose of 0.25 cc., the reinjected bulb succumbing 11 days later. (3) An experiment with ass serum on onion bulbs gave results comparable to the preceding.—It is inferred that a state of anaphylaxis may be established in plants.—*B. M. Duggar.*

MISCELLANEOUS

311. ACREE, S. F., R. R. MELLON, P. M. AVERY, AND E. A. SLAGLE. **A stable single buffer solution.** Jour. Infect. Diseases 29: 7–10. 1921.—The authors suggest a mixture having components whose dissociation constants are so graded than when the titration curve of one component ends the next begins. This gives a continuous smooth curve covering a wide range of P_H values.—The components, as employed in the buffer solution, are: (1) 1 mol. of KH_2PO_4, with a *Ka* of 1.1×10^{-2}; (2) ½ mol. of sodium formate, with a *Ka* of 2×10^{-4}; (3) ½ mol. of sodium acetate, with a *Ka* of 2×10^{-5}; (4) the 2nd group of K_2HPO_4, with a *Ka* of 2×10^{-7}; (5) 1 mol. of sodium phenol sulphonate, with a *Ka* of approximately 10^{-10}; (6) M/200 thymol to saturation (for H_2O, 0.08), with an approximate *Ka* of 0.5×10^{-10}; (7) the 3rd group of H_3PO_4 with a *Ka* of 10^{-12}.—To obtain any desired P_H it is only necessary to locate the point on the curve intercepted by the desired P_H value, and read off the amount of $\frac{N}{5}$ HCl or NaOH necessary to produce this P_H.—*Selman A. Waksman.*

312. BANCROFT, W. D. [Rev. of: SEIDELL, ATHERTON. **Solubilities of inorganic and organic compounds.** *2nd revised ed., 24 × 16 cm., xxii + 843 p.* D. Van Nostrand Co.: New York, 1919.] Jour. Phys. Chem. 24: 332. 1920.—"The new edition is very much more valuable than the first one and is a book of which the author may well be proud."—*Reviewer's summary.*

SOIL SCIENCE

J. J. SKINNER, *Editor*
F. M. SCHERTZ, *Assistant Editor*

(See also in this issue Entries 7, 14, 59)

313. ANONYMOUS. **The potash position.** Nature 107: 321–322. 1921.—This editorial reviews the supply and consumption of potash. The deposits of Alsace-Loraine are regarded as the most promising for the immediate future.—*O. A. Stevens.*

314. CROUZEL, E. **De l'emploi des sables ferrugineux en viticulture et en arboriculture.** [**Concerning the use of ferruginous sand in vinegrowing and in arboriculture.**] Repertoire Pharm. 33: 129–131. 1921.—Iron is an essential and indispensable element in plant growth. If not present in sufficient quantity, there is a marked diminution in the power of the plant to resist diseases, especially, those due to cryptogams. It is extensively used in vineyards and orchards. Ferruginous sand is much used on account of its abundance, cheapness, and favorable chemical properties.—*M. Dunn.*

315. DAVIS, W. A. **A study of the indigo soils of Bihar.** Indigo Publ. Agric. Res. Inst. Pusa 1. *75 p.* 1918.—The exhaustion of Bihar indigo soils has been gradual and progressive during the past 20 years. It was first indicated by the gradual failure of the yield of Java indigo seed and then by the rapidly increasing failure of khoonties (2nd cuttings). The failure

of the crop was first attributed to the "wilt" disease, but no evidence of bacterial or fungous infection has been obtained. The theory is put forward that the failure of indigo is due to lack of soluble phosphate in the soils. Low fertility or failure of crops can, in most cases, be correlated with an abnormally low content of available phosphate in the soils. Available phosphate is exceptionally low in the sub-soil and as indigo is a deep rooting plant, the lack of such nutrient material is manifested in the wilting or dying out of the indigo plant after the 1st cutting. Although Java indigo seed cannot now be grown at factories in Bihar, very good crops have been obtained in soils outside Bihar, particularly in Assam. In every case where Java indigo produces seed the soil has been found to be exceptionally rich in available phosphate. In many cases outside Bihar, the rainfall is excessive (150 inches) and the lands frequently get water-logged, but this has not prevented high yields of Java indigo plant and seeds. "Wilt" is most prevalent in Bihar on the highest, lightest and best drained soils; this is attributed to the low content of plant food which they contain. The soil responds generally to superphosphate, Java indigo at Dalsing Sarai increasing 50 per cent in the 1st cuttings and 100 per cent in the 2nd. In many cases the Tirhoot soils are also low in organic matter and treatment with green manure, such as sann hemp, is necessary before they respond to superphosphate.—*B. M. Amin.*

316. Duley, F. L., and M. F. Miller. **The effect of a varying supply of nutrients upon the character and composition of the maize plant at different periods of growth.** Missouri Agric. Exp. Sta. Res. Bull. 42. *66 p.* 1921.—Corn plants were grown in washed quartz sand with nutrient solutions. A standard Pfeffer's nutrient solution was used as the optimum nutrient and a solution $\frac{1}{10}$ this strength as the minimum nutrient. Fourteen different treatments were used, each in duplicate, including all possible combinations of the 2 solutions, applied in the three 30-day periods of the life of the plants.—The 2nd period was by far the most important in the production of vegetative parts. Ear production was confined to the 3rd period. A low supply of nutrient, particularly during the last period, was conducive to increased root growth. Optimum nutrient during the 3rd period largely determined ear production, though fair ears were produced when a copious supply of mineral nutrients was present at the end of the 2nd period and when the minimum nutrient was used in the 3rd period. The percentage of nitrogen and potassium in the plants was approximately proportional to the supply of nutrients during the last period, while the percentage of phosphorus was much less influenced by variation in the nutrient supply. The proportion of total nitrogen of the plant contained in the roots increased whenever the minimum nutrient was applied. In the most fully developed plants the proportion of potassium in the roots was increased during the 3rd period. Minimum nutrient supply allowed a greater proportional storage of nitrogen, phosphorus, and potassium in the roots than did optimum nutrient.—A review of the literature and a bibliography of 20 titles are included.—*L. J. Stadler.*

317. Hudig, J. **Wat kan het landbouwkundig onderzoek duen voor de droog te leggen Zuiderzee [What can agricultural research accomplish for future drained lands of the Zuiderzee?]** Cultura 33: 151–154. *1 fig.* 1921.—When the new lands are deprived of the sea water from the Zuiderzee, and influenced by the atmosphere, many changes will take place in the soil; a knowledge of these will be of great importance for agriculture. The soils will vary from heavy clay to sand and will vary chemically and physically.—*J. C. Th. Uphof.*

318. Marchand, B. de C. **The soils of Natal and the Transvaal. II. The soils of the Transvaal.** South African Jour. Indust. 4: 181–187. 1921.—The decomposition of organic matter is very rapid and nitrification takes place quickly. The soils are low in calcium and phosphate and high in iron. Nitrogen does not appear to be needed.—*J. J. Skinner.*

319. Skinner, J. J. **Fertilizer experiments with pecans conducted by the United States Department of Agriculture.** Proc. Georgia-Florida Pecan Growers' Assoc. 1921: 4–11. 1921.—A report is made on the fertilizer experiments made in Georgia and Florida for the last 3 years. The experiments conducted are based on the triangle, being ratio studies of phosphate, nitrate, and potash. Different sources of phosphorus, nitrogen, and potash are also included in the

investigation. The soils on which the pecan experiments are located are the Greenville sandy loam, Orangeburg sandy loam, and the Norfolk sandy loam. For best growth and development of a young orchard, a complete fertilizer high in nitrogen has given best results. Older orchards have a somewhat higher phosphate requirement. The amount of nitrogen in the fertilizer used can be reduced where leguminous cover crops are grown and plowed under. The fertilizer combinations giving maximum yield increased nut production from 20 to 35 per cent.—*J. J. Skinner.*

320. Truffaut, G., et N. Bezssonoff. **Augmentation du nombre des Clostridium Pastorianum (Winogradski) dans des terres partiellement stérilisées par le sulfure de calcium. [Increase in the number of Clostridium Pastorianum organisms in soil partially sterilized by the addition of calcium sulphide.]** Compt. Rend. Acad. Sci. Paris 172: 1319–1322. 1921.—It is contended that *Clostridium Pastorianum* and not *Azotobacter* is the principal agent of nitrogen fixation in the soil. *Clostridium Pastorianum* was found to the extent of 100,000 colonies per gr. against 500 of *Azotobacter*. The highest number reported for *Azotobacter* is 1800 per gr.—*C. H. Farr.*

321. Williams, C. O. **The soils of Natal and the Transvaal. I. The composition of Natal soils.** South African Jour. Indust. 4: 177–181. 1921.—The soils generally are acid and are characterized by the complete absence of calcium carbonate, except the soils of the Ladysmith and Weenen districts, which are alkali soils. The phosphate content is low and the potash content normal.—*J. J. Skinner.*

TAXONOMY OF VASCULAR PLANTS

J. M. Greenman, *Editor*
E. B. Payson, *Assistant Editor*

(See also in this issue Entries 25, 128, 262)

GENERAL

322. Anonymous. [Rev. of: Britton, N. L., and C. F. Millspaugh. **The Bahama flora.** *viii + 695 p.* The authors: New York Botanical Garden; Dulau and Co.: London, 1920 (see Bot. Absts. 7, Entry 1429).] Nature 107: 327–328. 1921.

323. Anonymous. [Rev. of: Horwood, A. R. **A new British flora: British wild flowers in their natural haunts.** (In 6 vols.) Vol. 1, *ix + 244 p.*; vol. 2, *xi + 243 p., 17 pl.* The Gresham Publishing Co.: London, 1919.] Nature 107: 232. 1921.

324. Anonymous. [Rev. of: Shoolbred, W. A. **The flora of Chepstow.** *x + 140 p.* Taylor and Francis: London, 1920.] Nature 106: 564. 1920.

325. Hitchcock, A. S. **The type concept in systematic botany.** Amer. Jour. Bot. 8: 251–255. 1921.—The author points out the importance of codes of nomenclature in stabilizing the naming of plants and indicates the advantages resulting from the Paris Code of 1867 and the Vienna Code of 1905. These have been found, however, to lack definiteness in directing the application of names. Names were originally applied rather to concepts than to entities. During the last 30 years the system of applying names by means of types has grown up in America and the type concept lies at the basis of modern botanical nomenclature. It is not referred to in the Paris and Vienna Codes, but was recognized by the American Code and by the Brussels Congress. The Type-basis Code, formulated by the Committee on Nomenclature of the Botanical Society of America, is described and its operation illustrated by various examples. The advantages of accepting the concept of types are pointed out, and it is shown that this does not involve the acceptance of any particular set of rules for selecting types.—*E. W. Sinnott.*

326. Knowlton, C. H. **Herbarium of Rev. W. P. Alcott.** Rhodora 23: 47. 1921.—The author notes the recent acquisition of this collection at the Peabody Academy of Sciences at Salem, Massachusetts. It is of most interest to the local student for its collection of wool-waste plants, made at North Chelmsford, Massachusetts.—*James P. Poole.*

327. Knowlton, C. H., and Walter Deane. **Reports on the flora of the Boston District,—XXXIV.** Rhodora 23: 113–118. 1920.—The authors present a continuation of the report of the Committee on Local Flora of the New England Botanical Club. A list of the reported species and their distribution about Boston, Massachusetts, is given.—*James P. Poole.*

328. Matsumura, Jinzo. **Icones Plantarum Koisikavenses, or figures with brief descriptive characters of new and rare plants, selected from the University Herbarium.** Maruzen Company, Ltd.: Tôkyô.—This work is published in parts at various intervals, there being 6 parts to a volume. Vol. I, *iv + 168 p., 84 pl.* 1913–1920. Parts 1–4 inclusive and part 6 of the 1st volume appeared in 1920. Part 5 (p. 127–146. *pl. 64–73*) bears the date June, 1913. Each species and variety included is illustrated and accompanied by descriptive matter in Latin and in Japanese. The following are designated either as new species, varieties, or new combinations: *Vaccinium japonicum* Miq. var. *ciliare* Matsum., *V. Myrtillus* L. var. *Yatabei* Matsum. & Komat. (*V. Yatabei* Makino), *Enkianthus Matsudai* Komat., *Diplazium Matsumurae* Kodama (*Asplenium Matsumurae* Christ), *Viola dissecta* Ledeb. var. *albida* Nakai (*V. albida* Palib.), *Clematis oligantha* Nakai, *Luzula campestris* DC. var. *lutescens* Koidz., *Streptopus streptopoides* Koidz. (*Smilacina streptopoides* Ledeb.), *S. streptopoides* var. *atrocarpa* Koidz., *Pasania cleistocarpa* O. Seem. (*Quercus cleistocarpus* O. Seem.), *Cacalia nantaica* Komat., *Salvia trisecta* Matsum., *Deutzia hebecarpa* Nakai, *Peucedanum Makinoi* Nakai, *Angelica confusa* Nakai, *Diplazium simplicifolium* Kodama, *Rhododendron Nakaii* Komat., *Eriocaulon Takae* Koidz., *Dryopteris pseudo-erythrosora* Kodama.—*Ibid.* Vol. II, *iii + 122 p., pl. 85–145.* 1914–1920. Of this volume Parts 2, 4, 5, and 6 appeared in Sept., 1920. Part 1, p. 1–22, *pl. 85–95*, was published in Jan., 1914, and Part 3, p. 45–64, *pl. 107–116*, bears the date July, 1914. The new species, varieties and combinations in this volume are: *Dryopteris izuensis* Kodama, *D. Fauriei* Kodama, *Vaccinium angustifolium* Komat., *Betula nikoensis* Koidz., *Lobelia boninensis* Koidz., *Fritillaria amabilis* Koidz., *Cardamine geifolia* Koidz., *Thalictrum Nakamurae* Koidz., *Aconitum Komatsui* Nakai, *A. Matsumurae* Nakai (*A. zigzag* Nakai, not Lévl. & Vnt.), *A. metajaponicum* Nakai, *Eriocaulon monococcos* Nakai, *Dryopteris gracilescens* O. Ktze. subsp. *glanduligera* (Ktze.) Chr. var. *abbreviata* Kodama, *D. insularis* Kodama, *Polystichum miyasimense* Kodama, *Skimmia japonica* Thunb. var. *intermedia* Komat., *Cornus subumbellata* Komat., *Elaeagnus crocea* Nakai, *Iris koreana* Nakai, *Rhododendron leptanthum* Hayata (*R. leptosanthum* Hayata), *Mnium Nakanishikii* Broth., *Juglans sachalinensis* Komat., *Aulacopilum japonicum* Broth.—*Ibid.* Vol. III, *iii + 134 p., pl. 146–212.* 1916–1920. Part 4, p. 65–84, *pl. 178–187*, of this volume bears the date Dec., 1916; all the other parts appeared in Sept., 1920. The new species, varieties, and combinations in this volume are: *Vittaria ogasawarensis* Kodama, *Polystichum microchlamys* Kodama (*Aspidium microchlamys* Christ), *Morus Kagayayamae* Koidz., *Malus asiatica* Nakai, *Mnium Kawadei* Sh. Okamura, *Macromitrium comatulum* Broth., *Rhododendron pentaphyllum* Max. var. *nikoense* Komat., *Diplazium longicarpum* Kodama, *Garovaglia formosica* Sh. Okamura, *Oxyrrhynchium Sasaokae* var. *immersum* Sh. Okamura, *O. Schottmülleri* Broth. var. *perlongicladum* Sh. Okamura, *Aconitum membranaceum* Nakai, *Pieris formosana* Komat., *P. pilosa* Komat., *Dianthus superbus* L. var. *bibracteolata* Koidz., *Evonymus tricarpa* Koidz., *Morus caudatifolia* Koidz., *Platanthera amabilis* Koidz., *Thalictrum yakusimense* Koidz., *Geranium Yoshiianum* Koidz., *Vaccinium hangchouense* Komat. (*V. Donianum* Wright var. *hangchouense* Matsuda), *Woodsia microsora* Kodama, *Calliergon perrecurrens* Broth., *Sphagnum Takedae* Sh. Okamura, *Viola glabella* Nutt. var. *reinfolia* Koidz., *Leucothoe glaucina* Koidz., *Betula incisa* Koidz., *Athyrium acutissimum* Kodama.—*Ibid.* Vol. IV, Parts 1–3. *72 p., pl. 213–248.* Sept., 1920.—The first 3 parts of this volume contain the following new species, varieties, and combinations: *Dryopteris tosensis* Kodama, *Thalictrum raphanorhizon* Nakai,

Rhododendron Kaempferi Pl. var. *angustifolium* Nakai, *Macromitrium Okamurae* Broth., *M. Nakanishikii* Broth., *Ranunculus altaicus* Laxmann var. *minor* Nakai, *Polygonum ussuriense* Nakai (*P. sagittatum* L. var. *ussuriense* Regel), *Athyrium rupestre* Kodama. Part 4, p. *73–84, pl. 249–254.* May, 1920. This part includes the following species new to science: *Leontopodium leiolepis* Nakai, *Pertya macrophylla* Nakai, *Aconitum hondoense* Nakai, and *Tripterocladium japonicum* Broth.—*J. M. Greenman.*

329. MIYABE, KINGO, AND YUSHUN KUDO. Icones of the essential forest trees of Hokkaido. *27 × 38.5 cm.* Fasc. 1. *1–15, pl. 1–4.* 1920; Fasc. 2. *15–26, pl. 5–7, fig. 1–2.* 1920; Fasc. 3. *27–33, pl. 8–10.* 1921. Published by the Hokkaido Government.—These fascicles represent the first of a series treating of the more important forest trees of Hokkaido. Each species here presented is copiously illustrated by a colored plate giving detailed representations of the important taxonomic features. The illustrations are accompanied by a text that gives detailed synonymy, citation of bibliography for the species involved, extended descriptions, statements of the habitat and distribution, and economic uses of the trees. In some cases a comparison is also made between the species described and closely related species with which it might be confused. In the first 3 fascicles 10 species of Coniferae are described and illustrated. The following new species, varieties, and combinations occur: *Abies Mayriana* (*A. sachalinensis* Fr. Schm. var. *Mayriana* Miyabe & Kudo), *A. Wilsonii*, *Larix dahurica* Turcz. var. *kamchatica* (*Larix kamchatica* Carr.), *Pinus himekomatsu*. In addition to the above, *Taxus cuspidata*, *Picea glehni*, *P. jesoensis*, *Pinus pentaphylla*, *P. pumila*, and *Thujopsis dolabrata* are depicted in the first 3 fascicles.—*E. B. Payson.*

330. PETCH, T. Recent revisions of Ceylon botany. Ann. Roy. Bot. Gard. Peradeniya 7: 139–166. 1920.—The author reviews various papers published in other periodicals in which additions are made to the known Ceylonese flora, proposed changes in nomenclature, etc.—*E. D. Merrill.*

331. SALISBURY, E. J. [Rev. of: ARBER, AGNES. Water plants: A study of aquatic angiosperms. *xvi + 436 p., 171 fig.* Cambridge University Press: 1920 (see Bot. Absts. 9, Entry 374).] Sci. Prog. [London] 15: 669–670. 1921.

332. SANDWITH, NOEL Y. Some British plants. Jour. Botany 59: 21–22. 1921.—Notes on *Fumaria paradoxa* Pugsley (*F. Martinii* Clavard), *Galeopsis speciosa*, *Pinguicula vulgaris*, *Nitella translucens*, *Sparganium neglectum*, and *Crataegus oxyacanthoides* are given.—*K. M. Wiegand.*

SPERMATOPHYTES

333. ANONYMOUS. [Note on Bupleurum protractum.] Proc. Linn. Soc. New South Wales 44: 820. 1919 [1920]. A note is given on specimens of *Bupleurum protractum* Link. & Hoffm. from the National Herbarium, and means of distinguishing it from *B. rotundifolium* L.—*Eloise Gerry.*

334. ANONYMOUS. [Rev. of: The flowering plants of South Africa. Edited by I. B. Pole Evans. Vol. 1, No. 1. *ii p., + 10 pl.* L. Reeve and Co.: London; The Speciality Press of South Africa: 1920.] Nature 107: 40. 1921.

335. ANONYMOUS. [Rev. of: MOSS, C. E. The Cambridge British Flora. Vol. III. Portulacaceae to Fumariaceae. *Folio, xvi + 200 p., 191 pl.* Cambridge University Press: 1920.] Jour. Botany 59: 24–27. 1921.

336. BAILEY, L. H. A collection of plants in China. Gentes Herbarum 1: 1–49. *17 fig.* 1920.—Under the title "Gentes Herbarum," the author has started a series of occasional papers relating to systematic botany, consisting of contributions from his private herbarium (Ithaca, New York). The first fascicle deals with a collection of plants made by him in eastern and central China in 1917; of particular interest are the collections from Honan, as the flora of that province was scarcely represented before in any herbarium. The short introduction

contains some notes on the vegetation of the regions traversed, and a recommendation to replace the term "new combination" by "new status" (*Status novus*) for new combination with change of rank, and "new transfer" (*translatio nova*) for those without change of rank. Following this, there is a systematic enumeration of the plants collected, about 900 species and varieties, with illustrations of the novelties. The following species, varieties, forms and combinations are new, and are proposed by the author, except when otherwise indicated: *Carex chikungana, C. kulingana, Smilax herbacea* var. *flaccida* (Wright) and *S. oblonga* (Wright) Norton, *Salix Baileyi, S. chikungensis* and *S. Matsudana* f. *pendula* Schneider, *Ficus Baileyi* Hutchinson, *Pilea Henryana* C. H. Wright, *Amaranthus gangeticus* var. *angustior, Raphanus sativus* var. *longipinnatus*, var. *nonpinnatus* and var. *parvipinnatus, Roripa microsperma* (DC.), *Philadelphus incanus* var. *Baileyi* Rehder, *Rosa cathayensis* (Rehd. & Wils.) and var. *exigua, Rubus innominatus* var. *Kuntzeanus* (Hemsl.) and var. *quinatus, R. kulinganus, R. triphyllus* var. *eglandulosus, Lespedeza distincta, L. Stottsæ, Maackia honanensis, Vicia kioshanica, V. kulingana, Ampelopsis brevipedunculata* var. *kulingensis* and var. *Maximowiczii* (Reg.) Rehder, *Vitis pentagona* var. *honanensis* Rehder, *Lysimachia argentata, L. chikungensis, Salvia honania, Satureia gracilis* (Benth.), *Stachys arrecta, Justicia quadrifaria* var. *lancifolia, Abelia Zanderi* var. *latifolia* Rehder, *Atractylis separata, Cacalia ruuescens* (S. Moore), *Chrysanthemum coronarium* var. *spatiosum*.—*Alfred Rehder.*

337. BLAKE, S. F. **New trees and shrubs from Yucatan.** Proc. Biol. Soc. Washington [D. C.] 34: 43–46. 1921.—*Acacia dolichostachya, A. Gaumeri, Diospyros anisandra, Citharexylum trinerve, Randia Millspaughiana,* and *Notoptera leptocephala* are described as new species.—*J. C. Gilman.*

338. [BLATTER, E., AND F. HALLBERG.] **Species novae Indiae Orientalis. Decas I.** Jour. Indian Bot. 2: 44–54. *5 fig.* 1921.—Descriptions in Latin are given of the following new species: *Myriophyllum spathulatum*, **Bonnayodes** a new genus of the Scrophulariaceae with one species *B. limnophiloides, Leucas macrantha, Euphorbia khandallensis, Lemna maxima, L. minima, Dendrobium actinomorphum, Pancratium St.Mariae, Scilla viridis,* and *Commelina heterosperma,* all from the Bombay Presidency and Rajputana.—*Winfield Dudgeon.*

339. BONNIER, GASTON. **Flore complète illustrée en coleurs de France Suisse et Belgique. [Complete flora, illustrated in color, of France, Switzerland, and Belgium.]** *4 to.* Fasc. 1–40. *136 p., 240 pl.* Librairie Général de l'Enseignement: Paris.—This is a somewhat popular work which has appeared in parts during the past 10 years and is still current. The parts bear no date of publication. The families treated thus far are the Ranunculaceae to the Umbelliferae inclusive and their sequence is essentially that of Bentham and Hooker's "Genera Plantarum." Rather full descriptions are given of the families, genera, and species, and accompanying the scientific name and description of the species are recorded a limited synonymy, common name, uses, properties, and distribution. No keys have been introduced in the work.—*J. M. Greenman.*

340. BRITTON, N. L., AND J. N. ROSE. **Neoabbottia, a new Cactus genus from Hispaniola.** Smithsonian Misc. Collection 72[9]: 1–6. *Pl. 1–4, fig. 1–2.* 1921.—The new genus **Neoabbottia**, based on *Cactus paniculatus* Lam., is described and discussed. The only species is *N. paniculata* (Lam.) Britton & Rose.—*S. F. Blake.*

341. CHASE, AGNES. **The North American species of Pennisetum.** Contrib. U. S. Nation. Herb. 22: 209–234. *Fig. 63–76.* 1921.—A short introduction, giving an account of the relationship of the genus and mentioning some of the more important cultivated species, is followed by the description and synonymy of the genus and by a key to the 14 North American species recognized. Under each of these are given synonymy, description, and a list of specimens examined. Each species is illustrated by a figure showing the panicle and usually also the leaves. *Pennisetum prolificum* from Mexico is the only new species described, but the name *P. distachyum* (Fourn.) Rupr. is apparently here first properly published.—*S. F. Blake.*

342. CHEEL, E. **Notes on Callistemon species.** Proc. Linn. Soc. New South Wales 45: 221. 1920.—Note is made of an exhibit of herbarium specimens with samples of timber from 2 distinct forms of *Callistemon viminalis* (Sol.) Cheel distinguished by their calyx tubes and bark, and of 2 varieties of *C. pachyphyllus* Cheel differing from the type specimens, from a different locality, in having narrower leaves and different colored flowers.—*Eloise Gerry.*

343. DUTHIE, J. F. **Flora of the Upper Gangetic Plain and of the adjacent Siwalik and Sub-Himalayan Tracts, Vol. III, Part II, Coniferae to Juncaceae.** *p. 169–283.* Superintendent Government Printing: Calcutta, 1920.

344. FASSETT, NORMAN C. **An estuarian variety of Scirpus Smithii.** Rhodora 23: 41–43. 1921.—A hitherto undescribed form of bulrush is described as *Scirpus Smithii* Gray var. *levisetus* n. var. The type was collected on the tidal flats of the Cathance River, at Bowdoinham, Maine, and at its mouth in Merrymeeting Bay.—*James P. Poole.*

345. FASSETT, NORMAN C. **Sium suave: a new and an old form.** Rhodora 23: 111-113. 1921.—A new form of this species has been found by the author in a tidal estuary of the Cathance River, Bowdoinham, Maine. It is here described as *Sium suave* Walt. forma *fasciculatum* f. nova. The author concludes that *Sium Carsonii* Durand is a weak aquatic state of *S. suave* and consequently reduces it to *S. suave* Walt. forma *Carsonii* (Durand) comb. nov.—*James P. Poole.*

346. FAWCETT, WILLIAM, AND A. B. RENDLE. **Notes on Jamaica plants.** Jour. Botany 59: 17–19. 1921.—(Continued from Jour. Bot. 57: 314. 1919 [see Bot. Absts. 6, Entry 395].)—Notes are given under Euphorbiaceae (III), Rutaceae, Anacardiaceae, Aquifoliaceae, and Celastraceae. A key to the species of *Comocladia* is inserted. The following species are described as new: *Comocladia troyensis, Ilex florifera, I. uniflora,* and *Maytenus microcarpa.*—*K. M. Wiegand.*

347. FERNALD, M. L. **Scutellaria epilobiifolia.** Rhodora 23: 85–86. 1921.—The American species *Scutellaria epilobiifolia*, distinguished by Arthur Hamilton in 1832, has been very generally reduced to the Old World *S. galericulata* L. The present author shows, however, that when fully mature nutlets of the 2 plants are examined they show such striking differences that it becomes apparent that Hamilton's species should be recognized. The American plant is, then, *S. epilobiifolia* Hamilton. For 2 striking color variations which occur Fernald proposes: *S. epilobiifolia* Hamilton forma *rosea* (Rand & Redfield) n. comb., and *S. epilobiifolia* Hamilton forma *albiflora* (Millsp.) n. comb. Parallel color-forms of *S. lateriflora* are proposed as forma *rhodantha* n. f., and forma *albiflora* (Farwell) n. comb.—*James P. Poole.*

348. FERNALD, M. L. **The North American representatives of Scirpus cespitosus.** Rhodora 23: 22–25. 1921.—The author cites evidence from the European and the American literature to show that the common sedge, *Scirpus cespitosus* L., is represented in North America by 2 varieties, namely, *S. cespitosus* L. var. *callosus* Bigelow and *S. cespitosus* L. var. *delicatulus* n. var. The bibliography, description, synonymy, and distribution of each of the varieties are given.—*James P. Poole.*

349. FERNALD, M. L., AND HAROLD ST. JOHN. **The American variations of Silene acaulis.** Rhodora 23: 119–120. 1921.—The authors publish the bibliography of *Silene acaulis* L. var. *exscapa* (All.) DC., and discuss its earlier recognition and description in the unpublished Flore de Terre-Neuve, St. Pierre et Miclon by Bachelot de la Pylaie about a century ago. Another variety of this species, occurring in the Rocky Mountains from Wyoming to New Mexico and Arizona, is here published as *S. acaulis* var. *subacaulescens* (F. N. Williams) n. comb.—*James P. Poole.*

350. FERNALD, M. L., AND C. A. WEATHERBY. **Equisetum fluviatile or E. limosum?** Rhodora 23: 43–47. 1921.—For nearly 50 years before the publication, in 1893, of the List of Pteridophyta and Spermatophyta of Northeastern North America, the common horseta l

of our marshes and rivershores was universally known to American botanists as *Equisetum limosum* L. In that work, the first attempt to apply the American Code, the name *E. fluviatile* was substituted. The present authors, after an investigation of the nomenclatorial history of the species, find that according to the International Rules, *E. limosum* must stand. They agree with the earlier authors that there appear to be no true varieties of the species in America, that the apparent varieties intergrade freely, occur commonly in the same colonies and sometimes even on the same rootstock, and recognize the more striking forms as *E. limosum* L. forma *minus* A. Br., forma *verticillatum* Doell, and forma *polystachium* (Brückn.) Doell. A key to these forms is published as well as the synonymy, bibliography, and distribution of each.—*James P. Poole.*

351. Godfery, M. J. **Two new orchid hybrids.** Jour. Botany 59: 57–60. *Pl. 557.* 1921.—Plants collected by A. M. Forbes in Italy are described as × *Serapicamptis Forbesii*, and are interpreted as a hybrid of *Serapias Lingua* L. and *Anacamptis pyrimidalis* Rich. The reasons for this view are given at length. Notwithstanding the great difference in length of spur in these 2 species it is believed that cross pollination may occur. Another orchid, from France, probably a cross between *Ophrys arachnitiformis* Gren., and *O. scolopax* Cav., is described as × *Ophrys Cranbrookeana.*—*K. M. Wiegand.*

352. Haines, H. H. **Some new species of plants from Bihar and Orissa.** Jour. Asiatic Soc. Bengal 15: 309–317. *Pl. 9–11.* 1920.—The following new species are described: *Hypericum Gaitii, Aglaia Haslettiana, Atylosia cajanifolia, Mucuna minima, Jussieua fissendocarpa, Pimpinella bracteata, Ligusticum alboalatum, Melothria zehnerioides, Oldenlandia arenaria, Lobelia aligera, Thesium unicaule,* and *Tragia Gagei.*—*E. D. Merrill.*

353. Hamilton, A. A. **Notes from the Botanic Gardens, Sydney.** Proc. Linn. Soc. New South Wales 45: 260–264. 1920.—Information is given on the following species: *Scirpus supinus* L., *Schoenus Moorei* Benth., *Lepidosperma quadrangulata* n. sp., *Grevillea punicea* R. Br. var. *crassifolia* n. var., *Hakea saligna* R. Br. var. *angustiflora* n. var., *Pultenaea ferruginea* Rudge, *Prostanthera densa* n. sp., *P. rhombea* R. Br., *P. saxicola* R. Br. var. *montana* n. var., and *P. debilis* F. v. M.—*Eloise Gerry.*

354. Henriot, Philippe. **Plantes rares ou nouvelles recueillies aux environs de Sainte-Foy-la-Grande. [Rare or new plants collected in the vicinity of Sainte-Foy-la-Grande.]** Proc. Verb. Soc. Linn. Bordeaux 70: 106–121. 1917–1918.—Attention is called to the comparative richness of the flora in the northeastern portion of the department of Gironde, France. The author gives an extensive list of the flowering plants that are rare or have not been reported previously from this locality. Notes are given describing the exact stations at which many species occur together with miscellaneous information as to peculiarities of distribution.—*E. B. Payson.*

355. Kenoyer, L. A. **Notes on Vallisneria.** Jour. Asiatic Soc. Bengal 15: 303–304. 1920.—The differences between European, American, and Indian forms of the so-called *Vallisneria spiralis* are tabulated.—*E. D. Merrill.*

356. Khadilker, T. R. **Description of the inflorescence of Amorphophallus campanulatus Bl.** Jour. Indian Bot. 2: 55–56. *1 fig.* 1921.

357. McAtee, W. L. **Notes on Viburnum and the assemblage Caprifoliaceae.** Bull. Torrey Bot. Club 48: 149–154. *1 fig.* 1921.—The species of *Viburnum* in the United States do not have "stellate" pubescence, but "fasciculate." *V. nudum* and *V. cassinoides* intergrade; while the leaves of the former are generally said to be entire, crenulations can generally be found on both species by unrolling the margin; the shape of the pit of the fruit is a more reliable character. The 2 species seem to hybridize. Whorled leaves cannot be said to distinguish Rubiaceae from Caprifoliaceae, for many of the latter possess such, especially on strong root shoots. The same situation exists in the case of the stipules, for some of the

Caprifoliaceae may possess them. The Caprifoliaceae if merged with the Rubiaceae run to tribes in all parts of the family; since they do not remain a unit, they do not pass the test "which should leave any satisfactory plant family intact."—*P. A. Munz.*

358. Maiden, J. H. **Notes on the colouration of the young foliage of Eucalyptus.** Proc. Linn. Soc. New South Wales **44**: 761–766. 1919 [1920].—Observations on the colors, which shade from crimsons and purples to greens and yellows, were made. The color is lost in a few hours after the removal of the branches but may be preserved for 1 or 2 days if the specimens are packed in closely shut tins. A grouping of species based on these colors is given.—*Eloise Gerry.*

359. Merrill, Elmer D. **On the application of the generic name Melodorum of Loureiro.** Philippine Jour. Sci. **15**: 125–137. 1919.—The genus *Melodorum* was proposed by Loureiro in 1790. Hooker and Thomson after examining the type regarded it as a plant of doubtful affinity but would retain *Melodorum* as interpreted by Dunal and Blume. Merrill thinks it best for the present to retain *Melodorum* as a genus closely allied to *Popowia* and proposes to adopt Griffith's *Fissistigma* as a generic name for the species currently but erroneously known as *Melodorum.*—*Albert R. Sweetser.*

360. Merrill, E. D. **On the identity of Aegiphila viburnifolia Jussieu.** Philippine Jour. Sci. **16**: 449–451. *Pl. 1.* 1920.—A study of Jussieu's type convinces the writer that it belongs to the genus *Elaeodendron*, and he proposes *E. viburnifolium* (Juss.) comb. nov., a species hitherto unreported from the Philippines but to be expected from the region around Jolo.—*Albert R. Sweetser.*

361. Neyraut, E. J. **Matériaux pour servir à l'étude du genre Prunus.** [**Material to serve for the study of the genus Prunus.**] Proc. Verb. Soc. Linn. Bordeaux **70**: 172–179. *8 fig.* 1917–1918.—*Prunus elegans* Clavaud is described in great detail.—*E. B. Payson.*

362. Pennell, Francis W. **Penstemon tenuiflorus.** Addisonia **4**: 79, 80. *Pl. 160 (colored).* 1919.—An ornamental plant native of the central Mississippi Valley. It is closely related to *P. hirsutus* and is here proposed as new.—*T. J. Fitzpatrick.*

363. Pfeiffer, Hans. **Zur Systematik der Gattung Chrysithrix L. und anderer Chrysithrichinae.** [**The systematic position of Chrysithrix L. and of other genera of the Chrysithrichinae.**] Ber. Deutsch. Bot. Ges. **38**: 6–10. 1920.—The author states that the genera *Chrysithrix*, *Lepironia*, and *Chorizandra* must, on the basis of their flower structure and of the anatomy of their stems, be removed from the Cyperaceae and placed in the Restionaceae.—*R. M. Holman.*

364. Phillips, E. P. **The Natal species of the Sapindaceae.** Bothalia **1**: 57–64. 1921.—Twelve genera have been recorded from South Africa and of these 9 occur in Natal.—*E. P. Phillips.*

365. Phillips, E. P., and J. Hutchinson. **A revision of the African species of Sesbania.** Bothalia **1**: 40–56. 1921.—The results of this investigation might very well have been more satisfactory had there been more field notes available regarding the situation, habit, floral coloring, etc. That this information is vital in the determination and limitation of the species of *Sesbania*, at least, has been well demonstrated by Prain in his critical elucidation of the Indian species. In the case of the African species the appendages on the claw of the vexillum has been found a most useful and constant character.—*E. P. Phillips.*

366. Piper, C. V. **Two new legumes from Mexico and Costa Rica.** Proc. Biol. Soc. Wash. **34**: 41–42. 1921.—*Phaseolus chiapasanus* and *Calopogonium ferrugineum* are described as new species.—*J. C. Gilman.*

367. POLE EVANS, I. B. **The flowering plants of South Africa.** Vol. I. Part 1. *Pl. 1–10.* 1920.—This number contains colored plates and descriptions of *Agapanthus umbellatus* L'Herit., *Aloe globuligemma* Pole Evans, *Arctotis Fosteri* N. E. Br. n. sp., *Cyrtanthus contractus* N. E. Br. n. sp., *Gerbera Jamesoni* Bolus, *Gladiolus psittacinus* Hook. f. var. *Cooperi* Baker, *Leucadendron Stokoei* Phillips n. sp., *Tulbaghia violacea* Harv., and *Richardia angustiloba* Schott. *Ibid.* Part 2. *Pl. 11–20.* 1921. Illustrations and descriptions are given of the following species: *Freesia Sparrmannii* N. E. Br. n. comb., (*Gladiolus Sparrmannii* Thunb.), *Crassula falcata* Wendl., *Clivia miniata* Regel, *Gardenia globosa* Hochst., *Richardia Rehmanni* N. E. Br., *Adenium multiflorum* Klotzch, *Aloe Pienaarii* Pole Evans, *A. pretoriensis* Pole Evans, *Clerodendron triphyllum* Pearson n. comb. (*Cyclonema triphyllum* Harv.), and *Gladiolus Rehmanni* Baker.—*E. M. Doidge.*

368. PUGSLEY, H. W. **On Hieracium aurantiacum L.** Jour. Botany 59: 60–69. 1921.—This species as it occurs in Britain is divided by the author into 2 species, one with subterranean stolons, broad leaves, and orange red or brick red heads, and another with superficial stolons, narrow leaves, and brownish-orange heads. The former is considered to be the typical *H. aurantiacum* of Linnaeus, while the latter is described as new under the name *H. brunneocroceum.*—*K. M. Wiegand*

369. REHDER, ALFRED. **Azalea or Loiseleuria.** Jour. Arnold Arboretum 2: 156–159. 1921.—The different conceptions of the genus *Azalea* are discussed and the conclusion reached that the type of *Azalea* L. is *A. procumbens* L., now generally referred to *Loiseleuria,* and that the name *Azalea* in the sense of DESVAUX should be replaced by another generic name and by another subgeneric or sectional name if referred to *Rhododendron.*—*Alfred Rehder.*

370. REHDER, ALFRED. **New species, varieties and combinations from the herbarium and the collection of the Arnold Arboretum.** Jour. Arnold Arboretum 2: 174–180. 1921.—The present article contains an enumeration of the forms of *Ampelopsis brevipedunculata* Koehne and the following new combinations, hybrids, varieties and forms: *Ampelopsis brevipedunculata* var. *Maximowiczii* f. *citrulloides* (Lebas) and f. *elegans* (K. Koch), *A. brevipedunculata* var. *vestita* (Rehd.) and var. *Hancei* (Planch.), *Columella oligocarpa* (Lév. & Vaniot), × *Juglans Bixbyi* and var. *lancastriensis, Rubus Henryi* var. *bambusarum* (Focke), *Xylosma congestum* var. *pubescens* (Rehd. & Wils.), *Cornus florida* f. *xanthocarpa,* × *Symphoricarpus Chenaulti.* [See also Bot. Absts 7, Entries 1476, 2227; 8, 734.]—*Alfred Rehder.*

371. REHDER, ALFRED. **Philadelphus verrucosus Schrader spontaneous in Illinois.** Jour. Arnold Arboretum 2: 153–156. 1921.—*Philadelphus verrucosus* Schrad., hitherto known only as a cultivated plant, was discovered in 1919 by E. J. Palmer in southern Illinois; the synonymy of the species and a description based on the wild plant are given.—*Alfred Rehder.*

372. SARGENT, C. S. **Notes on American trees. VIII.** Jour. Arnold Arboretum 2: 164–174. 1921.—The following combinations, varieties, and forms are new: *Cyrilla racemiflora* var. *parvifolia* (Shuttl.), *Acer glabrum* f. *trisectum, Acer nigrum* var. *Palmeri, Vaccinium arborescens* var. *glaucescens* (Greene), *Bumelia languinosa* var. *albicans, B. languinosa* var. *anomala, Diospyros virginiana* var. *platycarpa* with f. *atra, D. virginiana* var. *Mosieri* (Small), *Halesia monticola* (Rehd.), *H. monticola* var. *vestita* with f. *rosea,* and *Fraxinus caroliniana* var. *Rehderiana* (Lingelsh.). There are also notes on the geographical distribution of *Robinia Pseudacacia, R. neomexicana,* and *Halesia parviflora,* and on the synonymy of *Byrsonima lucida.*—*Alfred Rehder.*

373. STEPHENSON, T., AND T. A. STEPHENSON. **Orchis latifolia in Britain.** Jour. Botany 59: 1–7. 1921.—In this paper the view is held that *O. latifolia* is a distinct but variable species. In this matter the author agrees with Godfery and Druce, and not with Rolfe. Reasons for not considering it a hybrid are given. The relation of *O. latifolia* to *O. praetermissa, O. maculata, O. Fuchsii, O. purpurella, O. incarnata,* and *O. ericetorum* is discussed.—*K. M. Wiegand.*

374. TAYLOR, MARY A. **The figworts of Ohio.** Ohio Jour. Sci. 21: 217–239. 1921.—This study of the Scrophulariaceae of Ohio is based largely on the Ohio State Herbarium. The nomenclature follows that of Britton and Brown's Illustrated Flora, 2nd edition. A synopsis and key to the genera are included.—*H. D. Hooker, Jr.*

375. Trelease, William. **North American Pipers of the section Ottonia.** Amer. Jour. Bot. 8: 212–217. *Pl. 4.* 1921.—Twelve North American species of *Piper*, belonging to the section *Ottonia*, are described, of which the following are new species: *P. Thiemeanum*, *P. Tatei*, *P. brachypus*, *P. Rosei*, *P. Diguetianum*, *P. Mas*, *P. abalienatum*, and *P. albicaule*.—*E. W. Sinnott.*

376. Weatherby, C. A. **A form of Ilex opaca.** Rhodora 23: 118–119. 1921.—The author discusses that variant of the species which is distinguished by the possession of entire or subentire leaves. This investigation disclosed no distinctive characters other than those of the leaves. The author proposes this form as *Ilex opaca* Ait. forma *subintegra* f. nov.—*James P. Poole.*

377. White, C. T. **A revised account of the Queensland Lecythidaceae.** Proc. Linn. Soc. New South Wales 44: 822–825. *Pl. 44.* 1919 [1920].—A revision of the species found in Queensland of the genera *Barringtonia* Forst. and *Careya* Roxb. is given. The recognised advisability of keeping these plants and their allies distinct from the Myrtaceae is pointed out. *Careya australis* F. v. M., *Barringtonia speciosa* Forst., *B. calyptrata* R. Br., *B. longiracemosa* sp. nov. (pl. 44), and an incompletely differentiated species are described. *B. acutangula* Gaertn. and *B. racemosa* Gaud. are excluded from the Queensland flora. Information on synonymy and distribution is included.—*Eloise Gerry.*

378. Wiegand, K. M. **Amelanchier anabalis, a new name.** Rhodora 23: 48. 1921.—This new name is proposed to replace *A. grandiflora* which the author published in Rhodora 22: 149. 1920. While the latter paper was in press, *A. grandiflora* was proposed by Rehder for another common hybrid form, thus making a substitution necessary.—*James P. Poole.*

MISCELLANEOUS

B. E. Livingston, *Editor*
S. F. Trelease, *Assistant Editor*

379. Anonymous. **A query concerning a lichen.** Agric. Gaz. New South Wales 32: 412. 1921.—Lichen could not be considered a timber-preserving plant.—*L. R. Waldron.*

380. Bancroft, W. D. [Rev. of: Slosson, E. E. **Creative chemistry.** *20 × 14 cm., x + 311 p.* The Century Co.: New York, 1919.] Jour. Phys. Chem. 24: 329–331. 1920.—The book contains a great deal of unusual information concerning plant products, their uses, and the direct and indirect influences of war upon agriculture. "One is continually running across unsuspected information, as, for instance, that the red rubber sponge and eraser tips for pencils may be made from a gum extracted from the corn germ. There are relatively few mistakes," and "in spite of occasional defects the book is an extremely valuable one."—*H. E. Pulling.*

381. Potter, M. C. **British plants as a source of industrial alcohol.** Nature 107: 170–171. 1921.—By-products of *Brassica* spp., such as cabbage stalks and petioles, petioles of turnips and rutabagas, contain considerable sugar which might be utilized. Other possible sources are sugar in rhizomes of couch grass (*Agropyron repens*) and in the uni-internodal corms of the bulbous oat-grass (*Arrhenatherum avenaceum*), starch in rhizome of bracken-fern (*Pteris aquilina*), and inulin in roots of spear thistle (*Carduus lanceolatus*).—*O. A. Stevens.*

382. Roth, E. **Nahrungsmittel aus Getreide.** [Grain foods.] [Rev. of: Maurizio, A. **Die Nahrungsmittel aus Getreide, ihre botanischen, chemischen und physikalischen Eigenschaften, hygienisches Verhalten, Prüfen und Beurteilen.** (Grain foods, their botanical, chemical and physical qualities, hygienic nature, tests, and grades.) Vol. 1. *xii + 468 p., 2 pl., 180 fig.* Parey: Berlin, 1917.] Leopoldina 54: 42–44. 1918.—The reviewer recommends Maurizio's work highly, not only on account of its exhaustive treatment of grains from all points of view, but also on account of its avoidance, so far as possible, of technicalities.—*A. W. Evans.*

DECEMBER, 1921 No. 2
ENTRIES

NICAL ABSTRACTS

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PUBLISHED MONTHLY UNDER THE DIRECTION OF

OF CONTROL OF BOTANICAL ABSTRACTS, INC.

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THE SOCIETIES NOW REPRESENTED

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CONTENTS

BOTANICAL ABSTRACTS

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UNDER THE DIRECTION OF

THE BOARD OF CONTROL OF BOTANICAL ABSTRACTS, INC.

J. R. SCHRAMM, Editor-in-Chief
Cornell University, Ithaca, New York

Vol. X | DECEMBER, 1921 | No. 2

ENTRIES 383-858

AGRONOMY

C. V. PIPER, *Editor*
MARY R. BURR, *Assistant Editor*

(See also in this issue Entries 436, 437, 438, 518, 524, 531, 576, 580, 704, 717, 718, 751, 769, 793, 797, 799, 856, 858)

383. ANONYMOUS. Chinese peanut oil. Pharm. Jour. 106: 262. 1921.—The extraction of the oil from *Arachis hypogaea* is carried out in Kwantung province, China, as follows: The washed dried fruits are passed through a large rice husking mill, the seeds are separated over coarse rattan sieves, and reduced to a meal in narrow mortars with huge stone pestles. The meal is steamed in shallow wooden tubs over a boiling cauldron and pressed in a large hollowed tree trunk, an enormous pressure being obtained against the packed meal by the use of wooden wedges. The oil as received is clear and ready for use.—*E. N. Gathercoal.*

384. ANONYMOUS. Landwirte. Sammelt Eure Erfahrungen über die neueingeführten schottischen und irischen Kartoffelsorten. [Farmers, collect your experiences with the new Scotch and Irish potatoes.] Oesterreich. Zeitschr. Kartoffelbau 1[6]: 21-22. 1921.—Instead of 3 varieties only of English potatoes which were originally to be imported, 22 have been sent many of which are immune to the wart disease. The official potato commission plans to obtain comprehensive data as to the value of each new variety as compared with the old Austrian sorts.—*F. Weiss.*

385. ANONYMOUS. Statistical data compiled by the Bureau of Crop Estimates 1863-1920. U. S. Dept. Agric. Dept. Circ. 150. *64 p.* 1921.

386. AGELASTO, A. M. Linters. U. S. Dept. Agric. Dept. Circ. 175. *10 p.* 1921.—Cotton fiber known as "linters" is composed of short hairs removed not by gins, but by a process used at the oil mills in cleaning and preparing seed for crushing. The character, length of fiber, production, handling, sampling, selling, and commercial values are discussed.—*L. R. Hesler.*

387. BIPPART, E. Vertilgung von Wildhafer. [Extermination of wild oats.] Illus. Landw. Zeitg. 41: 228. 1921.—This plant (*Avena fatua* L.) is an important weed, chiefly on heavy clay soils rich in calcium. It is often a serious pest in beet fields and in fields of spring grain. As the wild oat plant is killed by autumn frosts, it is not found in fields of winter grain except in spots in which the stand is poor. Since the seed of wild oats germinate at lower

temperatures than do seeds of cultivated grains, the plant makes its appearance in the field before those of the summer grains. Taking advantage of this fact, summer grain should not be sown in an infested field until after the wild oats have appeared, after which shallow cultivation should be practiced to kill the young plants, care being taken not to cultivate so deep as to bring new seed to depths permitting germination; the field should then be planted to the grain desired. This method failing, the field should be mowed before the weed seed ripens thereby preventing infestation the following year. The seeds are capable of germination even when several years old. To avoid bringing up old seeds to the proper depth for germination, only shallow cultivation should be practiced in infested fields.—*John W. Roberts.*

388. Camp, Wofford B. **Cotton culture in the San Joaquin valley in California.** U.S. Dept. Agric. Dept. Circ. 164. *22 p., 11 fig.* 1921.—A general treatise of the subject is presented together with a list of publications bearing on Egyptian cotton growing in the southwestern states.—*L. R. Hesler.*

389. Damon, S. C. **Experiences with alfalfa.** Rhode Island Agric. Exp. Sta. Bull. 184. *26 p.* 1921.—A compilation of miscellaneous tests which have been conducted at the station from time to time during the last quarter century is presented.—*B. L. Hartwell.*

390. [Druce, G. C.] [Rev. of: Goulding, E. **Cotton and vegetable fibres, their production and utilization.** *x + 230 p.* John Murray: London, 1916.] Bot. Soc. and Exchange Club British Isles Rept. 5: 75–76. 1917 [1918].

391. Hansen, Albert A. **Lawn pennywort: a new weed.** U. S. Dept. Agric. Dept. Circ. 165. *6 p., 3 fig.* 1921.—*Hydrocotyle rotundifolia*, introduced from southern Asia previous to 1890 as an ornamental plant, has become rather widely distributed as a weed in lawns. It is known to occur in the District of Columbia, Pennsylvania, and Kentucky. Directions for its eradication are given.—*L. R. Hesler.*

392. Hansen, Dan. **The work of the Huntley reclamation project experiment farm in 1919.** U. S. Dept. Agric. Dept. Circ. 147. *27 p., 4 fig.* 1921.—A report is presented of experimental work with crops, including rotation, grasses, varieties, sugar beets, silage, and fruits.—*L. R. Hesler.*

393. Hartwell, Burt L. **Field experiments which included the soy-bean.** Rhode Island Agric. Exp. Sta. Bull. 183. *15 p.* 1920.—Numerous varieties have been tested. Yellow-seed varieties have been sought which are late enough to give satisfactory tonnage for silage, and yet early enough to yield viable seed or seed which might be used for human food.—For use with corn for silage purposes, an insufficient proportion of the beans was obtained by planting the crops together in the same drill. There were no indications that the corn derived any advantage from the companionship.—Soy beans yielded more than cowpeas. The hay contained from 2.75 to 3.00 per cent of nitrogen.—Although nitrate of soda did not decrease the growth of soy beans, it did decrease the weight of the nodules.—The ability of soy beans to secure their needs for phosphorus was found to rank between that of carrots, which obtained their full requirements, and turnips which were practically unable to grow without phosphatic application.—Soy beans were able to derive $\frac{3}{4}$ of their potassium needs from a soil so deficient that mangels could obtain only about $\frac{1}{2}$ and summer squash about $\frac{1}{10}$ of their requirements.—*B. L. Hartwell.*

394. Hartwell, Burt L., and S. C. Damon. **Fertilizer requirements of rotations including corn, potatoes, rye and hay.** Rhode Island Agric. Exp. Sta. Bull. 185. *39p.* 1921.—Results for the 21st to 27th year of 5 different rotations together with results from associated plants receiving differing fertilizers are presented; also, the record of the first 2 rounds of a 7-year rotation.—From two 5-year rotations which differed only in that clover was included in one and not in the other, the hay in one round of the clover rotation contained 132 pounds more nitrogen per acre than in the other. The yields of the other crops did not differ much.—Where no farm manure was used, fertilizer chemicals equivalent to different amounts of a 5:8:5 fertilizer sufficed in general for the different crops.—*B. L. Hartwell.*

395. HAUNALTER, EMIL. **Die Auswahl und die Vorbereitung der Pflanzkartoffel. [The selection and preparation of potatoes for seed.]** Oesterreich. Zeitschr. Kartoffelbau 1[3]: 10–11. 1921.—Selection of varieties for food, industrial and fodder purposes, and selection of tubers for seed are discussed. The author recommends medium-sized (for the variety) whole tubers for seed, claiming that cut seed results in reduced yields, susceptibility to disease, and degeneration.—*F. Weiss.*

396. MCMILLER, P. R. **Fertilizer tests pay in Minnesota.** Potato Mag. 3[12]: 26. 1921.—In 1920 on 27 farms the application of a complete commercial fertilizer resulted in greater yield of potatoes, each bushel increase costing from 0.18 to 1.77 dollars. The weather was unfavorable. The soil was mostly sandy loam, and in some cases was treated with stable manure.—*Donald Folsom.*

397. MILLARD, W. A. **Dry spraying for the destruction of charlock.** Jour. Ministry Agric. Great Britain 28: 134–142. *1 fig.* 1921.—In certain parts of England it is not convenient to secure a supply of water for wet spraying for charlock, consequently some tests were conducted during 1919 and 1920, near Leeds, on the use of some powdered chemicals for destroying the weed in grain fields. Nitrolim (calcium cyanamide) was found to be of no value, iron sulphate was effective only in such large quantities as to make it impracticable because of the cost, but copper sulphate gave excellent results. The latter, finely ground and applied at the rate of 20 pounds to the acre, destroyed the charlock provided seed had not set. For successful control the weather should be fairly settled, there should be a heavy dew, but no wind at the time of application; with these conditions dry spraying is quite as effective as wet spraying.—*M. B. McKay.*

398. NICHOLLS, W. D., AND F. W. PECK. **The cost of producing tobacco in Kentucky. (A preliminary report.)** Kentucky Agric. Exp. Sta. Bull. 229. *135–190, illus.* 1921.—One-year cost of production studied on 81 farms in the Burley areas covering 625.5 acres of Burley tobacco and 70 farms in the Dark area covering 679 acres of dark tobacco is given. The total cost per acre, including land rent, in the Burley district ranged from 163.06 to 403.18 dollars, averaging 289.10, with over ½ of the acreage being produced at between 200 and 300 dollars per acre. In the Dark district the total cost per acre varied from 100.03 to 308.19 dollars, averaging 141.76, with over ½ the acreage being grown at a cost of 125 to 150 dollars per acre. Ninety per cent of the Burley tobacco was grown at a cost of 31 cents or less per pound, averaging 26 cents. In the Dark area 90 per cent was grown at a cost of 23 cents or less per pound, averaging 17.2 cents.—*W. D. Valleau.*

399. OAKLEY, R. A., AND H. L. WESTOVER. **Effect of the length of day on seedlings of alfalfa varieties and the possibility of utilizing this as a practical means of identification.** Jour. Agric. Res. 21: 599–607. *Pl. 111–121.* 1921.—*Medicago falcata* and the 4 varieties of alfalfa,—Peruvian, Kansas, Grimm, and Turkestan,—were grown under conditions for control of exposure to light. Seedlings grown under conditions of a short January day and of a shortened day (7-hour exposure) showed the following sequence with respect to height, erectness, and lack of branching: Peruvian, Kansas, Grimm, Turkestan, *M. falcata.* Under exposure to a lengthened day (electric illumination until 11 o'clock at night) the order is practically reversed. By controlling light conditions it is possible to distinguish between seedlings of the commercial groups of alfalfa.—*D. Reddick.*

400. PARKER, W. H., AND H. CHAMBERS. **The nomenclature of agricultural plants.** Jour. Ministry Agric. Great Britain 28: 167–180. 1921.

401. PIETERS, A. J., AND L. W. KEPHART. **Annual white sweet clover and strains of the biennial form.** U. S. Dept. Agric. Dept. Circ. 169. *21 p., 8 fig.* 1921.—The authors have brought together all available information on the new sweet clover, including its history, characteristics, and probable usefulness. The existence of several distinct varieties of biennial white sweet clover is noted with brief descriptions of their characteristics.—*L. R. Hesler.*

402. RATZER, WILHELM VON. **Esparcette (Onobrychis sativa).** Bienen-vater 53: 64–65. 1921.—The article gives details of growth, blooming period, type of soil required, etc., of the above species. Sanfoin can be grown successfully as far north as the 66th parallel in Europe. It is very valuable for various purposes, such as increasing the productivity of the soil, as hay, and for its excellent light-colored honey.—*M. G. Dadant.*

403. ROBERTS, HERBERT F. **Relation of hardness and other factors to protein content of wheat.** Jour. Agric. Res. 21: 507–522. *Pl. 100, 2 fig.* 1921.—A study of available data shows that the correlation between hardness of wheat and protein content is practically nil; this is contrary to common assumption. No correlation is found between specific gravity and protein content nor between volume of the grain and protein content.—*D. Reddick.*

404. RÜMKER. **Winterweizenversuche der Preussischen Forschungsgesellschaft für Landwirtschaft-Berlin in Emersleben 1919–20. [Winterwheat experiments of the Prussian Agricultural Research Society in Emersleben 1919–20.]** Illus. Landw. Zeitg. 41: 185–186. 1921.—A brief report is made of field tests of 40 varieties of winter wheat.—*John W. Roberts.*

405. SALAMAN, REDCLIFFE N. **The influence of size and character of seed on the yield of potatoes.** Jour. Ministry Agric. Great Britain 28: 43–48. 1921.

406. SAYRE, L. E. **Corn oil.** Trans. Kansas Acad. Sci. 29: 114–115. 1920.—A brief statement is made of the excellent keeping qualities, very low melting point but high smoking point, of corn oil and its use as a food.—*F. C. Gates.*

407. SIEGMUND, GUSTAV. **Die Hebung unserer Kartoffelproduktion durch die englische Saatkartoffelaktion. [The improvement of our potato production through the English seed potato arrangement.]** Oesterreich. Zeitschr. Kartoffelbau 1[4]: 13–14. 1921.—The greatest obstacle to recovery of Austrian potato production, which had fallen about 40 per cent, was the lack of good seed. The furnishing of the best Scotch and Irish varieties through the English Reparation Commission has to a considerable extent overcome the deficiency.—*F. Weiss.*

408. WACKER, J. **Einige Beobachtungen am Kartoffelsortiment des hohenheimer Versuchsfeldes vom Jahre 1920. [Some observations on varieties of potato in the Hohenheimer experiment field in the year 1920.]** Illus. Landw. Zeitg. 41: 132–133. 1921.—A brief report is made of variety tests of potato in which 93 sorts were used.—*John W. Roberts.*

409. WERNER, H. O. **Irrigation as a factor in seed potato production.** Proc. Amer. Soc. Hort. Sci. 17: 133–137. 1920 [1921].—Triumph potatoes were grown on the tuber unit basis under irrigation at Minatare, Nebraska, in 1917. They grouped themselves into a well-defined high-yielding group and a low-yielding group, with very few intermediates. Seed stock grown under irrigation gave consistently lower yields than seed stock not grown under irrigation. The data presented "indicate that the conditions produced by irrigation as practiced in the West, have a very markedly deleterious effect upon tubers for seed purposes, which is manifest after the first season. Disease has not been a factor in this work. Irrigation has been the only factor that can be considered responsible for the differences secured."—*H. A. Jones.*

410. WILLIAMS, C. B., W. F. PATE, E. C. BLAIR, AND R. W. COLLETT. **I. Fertilizer experiments with wheat on mountain soils. II. Wheat culture in North Carolina.** Bull. North Carolina Dept. Agric. 41[10]: 2–48. 1920.—Different amounts of mineral fertilizers were used on wheat with varying profit. General cultural recommendations are included in the paper.—*F. A. Wolf.*

411. WITTMACK, L. **Die Samen unserer Kleegewächse und ihre Verunreinigungen. [The seeds of our clovers and their adulterants.]** Illus. Landw. Zeitg. 41: 178–180. *7 fig.* 1921.—Descriptions, with drawings, are presented of the seeds of the following species: *Medicago sativa, M. falcata, M. denticulata, M. arabica, M. minima, M. lupulina, Trifolium pratense, T. repens, T. hybridum, T. angulatum, T. parviflorum, T. minus, T. supinum, T. incarnatum, Lotus corniculatus, L. uliginosus,* and *Anthyllis vulneraria.*—*John W. Roberts.*

BIBLIOGRAPHY, BIOGRAPHY, AND HISTORY

N. E. STEVENS, *Editor*

(See also in this issue Entries 492, 547, 802)

412. ANONYMOUS. **A plant protection institute.** Boooklyn Bot. Gard. Rec. 9: 127–128. 1920.

413. ANONYMOUS. **[Bothalia.]** Nature 107: 691. 1921.—The appearance of the first issue of this publication for new or little known plants of South Africa is reported. Subscriptions are to be sent to the Chief, Division of Botany, Pretoria.—*O. A. Stevens.*

414. ANONYMOUS. **Conference on fruit diseases.** Brooklyn Bot. Gard. Rec. 9: 128–129. 1920.—Notes are presented on attendance and questions discussed at the conference in the Shenandoah Valley, in Virginia, West Virginia, Maryland, and Pennsylvania, August 3–9, 1920, arranged by the Advisory Board of American plant pathologists.—*C. Stuart Gager.*

415. ANONYMOUS. **Co-operative indexing of periodical literature.** Nature 107: 449–450, 550–551. 1921.—A leading editorial discusses the possibility of making index material available to abstractors prior to the preparation of abstracts, which at present generally precede the corresponding index publication, an indefensible arrangement. A union catalogue of current periodicals in libraries of the United Kingdom, which was prepared in 1914–15, should be published as an essential preliminary to the proper organization of knowledge, and a common system of classification should also be agreed upon. The core of a subject is comprised in a body of homogeneous literature which can best be dealt with by its representative professional society, but outside this is a literature of decreasing relevance which can be economically handled only through cooperative work. The solution would seem to be a central bureau dealing solely with this non-homogeneous material, for which it would transmit entries to the professional societies. As the professional abstracts become better developed, the publication of corresponding indexes would tend to become less necessary. As different branches of knowledge may have different views on the relation of indexing to abstracting, a meeting should be held to determine the special requirements of each, and the feasibility of cooperative work. This editorial was followed in the later issue by a number of letters: F. A. BATHER regards conference to determine the needs of each branch unnecessary, and considers that publication of abstracts before indexes is not indefensible, as the two are different in aim, substance, and preparation, while W. M. FLINDERS PETRIE suggests that the method of handling depends on the future utility of abstracts, and with the latter in view has personally adopted the following form in abstracting: (1) State briefly every new fact and argument that leads to a definite result; (2) add references to any confirmatory or contradictory facts that have been omitted; (3) suggest whether or not the paper is essential.—*O. A. Stevens.*

416. ANONYMOUS. **The American Iris Society.** Brooklyn Bot. Gard. Rec. 9: 129. 1920.—A statement of the objects and activities of the society, organized in New York City on January 29, 1920, is presented.—*C. Stuart Gager.*

417. ANONYMOUS. [Rev. of: LAUFER, BERTHOLD. **Sino-Iranica. Chinese contributions to the history of civilization in ancient Iran, with special reference to the history of cultivated plants and products.** Field Mus. Nat. Hist. Publ. Anthropol. Ser. 15: iv + 185–630. 1919 (see Bot. Absts. 8, Entry 876).] Nature 107: 430–432. 1921.

418. AGRELIUS, F. U. G. **A half century of bacteriology.** Trans. Kansas Acad. Sci. 29: 23–34. 1920.—The presidential address given before the Kansas Academy of Science, March 15, 1918; an historical account.—*F. C. Gates.*

419. CĂRUNTU, D. **Cuvânt înainte.** [Foreword.] Bul. Agric. 1: 3–4. 1920.—There is announced and published the first number of Buletinul Agriculturii issued by the Ministerul Agriculturii și Domeniilor, Directiunea Agriculturii și Viticulturii, Bucharest, Roumania.—*J. R. Schramm.*

420. CONCEIÇÃO, JULIO. **Dr. Alberto Löfgren.** Rev. Mus. Paulista 11: 543–560. *Portrait.* 1919.—A biographical account is presented in Portuguese of Löfgren (1854–1918), who was born and educated in Sweden, but spent his life in scientific work in Brazil. He helped to organize the Geographical and Geological Commission of São Paulo, and in 1897 established the Botanical Garden there. He was interested in forest preservation and arboriculture, and active in securing forest legislation for São Paulo. In 1910–1911 he explored and made rich collections in Ceará, Parahyba, Rio Grande do Norte, Bahia, and Pernambuco, and in 1913 he was called to take charge of the section of botany and plant physiology in the Botanical Garden of Rio de Janeiro, where he remained until his death. A long list of his publications is given, perhaps the most important being his Manual das Familias Naturaes Phanerógamas (1917) with keys to Brazilian genera.—*Marie K. Pidgeon.*

421. DUFOUR, LÉON. **Notice sur l'œuvre scientifique du professeur Saccardo.** [A note on the scientific work of Professor Saccardo.] Rev. Gén. Bot. 33: 5–10. *Portrait.* 1921.—A brief biography and tribute to the accomplishments of P. A. Saccardo (1845–1920) is given.—*J. C. Gilman.*

422. LARSEN, TH., OG CARL MARIBOE. **Oversigt over fremmed Litteratur vedrørende Jorddyrkning og Plantekultur for Aar 1918.** [Review of foreign literature on agriculture and plant industry for the year 1918.] Tidsskr. Planteavl 27: 319–376. 1920.—The author presents a classified list of foreign literature, including American.—*Albert A. Hansen.*

423. LOBO, BRUNO. **O Museu Nacional de historia natural.** [The National Museum of natural history.] Arch. Mus. Nacion. Rio de Janeiro 22: 13–26. *2 portraits.* 1919.—Mention is made of the principal voyages and explorations relating to Brazil, and the contributions to the botany of the country of Maximilian of Wied, Spix and Martius, Humboldt and Bonpland, Saint-Hilaire, Pohl, Alfred Russel Wallace, and others.—*Marie K. Pidgeon.*

424. MAGALHAES, BASILIO DE. **Biographia de Antonio Luiz Patricio da Silva Manso.** [Biography of Antonio Luiz Patricio da Silva Manso.] Arch. Mus. Nacion. Rio de Janeiro 22: 77–96. 1919.—Silva Manso (1788–1848) was born at São Paulo and originally followed the vocation of his father, who was a painter, but later studied medicine, being licensed to practice in Campinas in 1820, and in 1821 became provincial surgeon of Matto Grosso. Here he became interested in politics, representing the province in the general assembly of Brazil, 1834-1837, and was held responsible for a massacre in the city of Cuyabá in 1834 in connection with the Brazilian struggle for independence. In retribution for this he was murdered January 17 or 18, 1848. He took up the study of botany in 1819, and in 1823 undertook to send plants and natural products of Matto Grosso to the Museu Nacional at Rio. He communicated plants to Martius, who in 1835 requested him to furnish 50 sets from Matto Grosso, especially rare plants or those of economic importance, for his projected Herbarium Brasiliense. Silva Manso wrote but little on botanical topics, but his services to Brazilian botany are highly rated by Martius in his Flora Brasiliensis and Systema Materiae Medicae Vegetabilis Brasiliensis (1843). The biography is accompanied by a list of sources and several hitherto unpublished documents.—*Marie K. Pidgeon.*

425. MORAL, A. **La Oficina de Sanidad Vegetal de la Secretaría de Agricultura, Comercio y Trabajo. Organizacion de la oficina. II.** [The Office of Plant Sanitation of the Department of Agriculture, Commerce and Labor. II. Organization.] Rev. Agric. Com. y Trab. [Cuba] 3: 287–289. *Portraits.* 1920.—John Robert Johnston, professor of phytopathology in the national university and director of tropical research of the United Fruit Co., is at the head of the office of plant pathology of the Cuban Department of Agriculture, and Felipe de la Cruz y Piñera is superintendent in charge of the office and personnel. There are 5 inspection zones with inspectors in charge; Reginald Hart, entomologist, is in charge of the service at ports, railroads, etc.; Charles Ballou in charge of inspection of gardens and nurseries; and Ernesto Moisés Simonetto in charge of the sugar cane mosaic inspection service. A list is given of the circulars and bulletins published.—*F. M. Blodgett.*

426. ROBERTS, J. W. **Stockton Mosby McMurran.** Phytopathology 11: 25–26. *Portrait.* 1921.—A short biographical sketch. [See also Bot. Absts. 8, Entry 1764.]—*B. B. Higgins.*

427. SAMPAIO, A. J. DE. **A Secção de Botanica no primeiro seculo de existencia do Museu Nacional. [The Section of Botany in the first century of the existence of the National Museum.]** Arch. Mus. Nacion. Rio de Janeiro 22: 37–47. 1919.—The National Museum of Brazil, founded in 1808, was by the decree of February 3, 1842, divided into sections, the 2nd of which was devoted to botany, agriculture, and the mechanic arts. Luis Riedel, its first director, 1842–1861, did much to build up the herbarium and library, and the section was further notably developed under the directorship of Ladislau Nette, 1865–1893. A full chronological record of all the directors, professors, and assistants of the section is given, together with summary of the South American collections represented in the herbarium.—*Marie K. Pidgeon.*

428. TESCHAUER, CARLOS. **Algumas notas sobre ethnologia e "folklore" na flora e avifauna do Brasil. [Some notes on the ethnology and folklore of the flora and avifauna of Brazil.]** Arch. Mus. Nacion. Rio de Janeiro 22: 221–230. 1919.—The associations and traditions relating to a small number of Brazilian plants are given, together with some uses among primitive inhabitants of the country.—*Marie K. Pidgeon.*

429. WOOSTER, L. C. **Botany in Kansas during the past fifty years.** Trans. Kansas Acad. Sci. 29: 41–43. 1920.—A part of a symposium on Fifty Years of Scientific Development in Kansas is presented. The work of several botanists is very briefly mentioned, including among others: J. H. Carruth, W. A. Kellerman, W. T. Swingle, B. B Smyth, Mrs. L. C. R. Smyth, A. S. Hitchcock, Minnie Read, L. E. Sayre, Grace R. Meeker, Elam Bartholomew, Frank U. G. Agrelius, and L. C. Wooster.—*F. C. Gates.*

BOTANICAL EDUCATION

C. STUART GAGER, *Editor*
ALFRED GUNDERSEN, *Assistant Editor*

(See also in this issue Entry 567)

430. ANONYMOUS. **200 leicht ausführb. botan. Schüler-Übungen nebst Resultaten. [Two hundred easily-performed botanical exercises, with results.]** *42 p.* F. P. Datterer & Cie.: Freising, Germany. *2 marks, 50 pf.*

431. ANONYMOUS. [Rev. of: MARTIN, J. N. **Botany with agricultural applications.** *2nd ed., xii + 604 p., 490 fig.* John Wiley: New York, 1920; Chapman & Hall: London, 1920 (see Bot. Absts. 8, Entry 1821).] Sci. Prog. [London] 16: 161. 1921.

432. BLARINGHEM, L. **Sur les collections des plantes vivantes de l'Arnold Arboretum (Université d'Harvard, près Boston, États-Unis). [Concerning the collection of living plants at the Arnold Arboretum (Harvard University).]** Bull. Soc. Bot. France 66: 403–405. 1919.

433. CROW, J. W. **Relation of our society to the development of horticulture.** Proc. Amer. Soc. Hort. Sci. 16: 149–151. 1919 [1920].—Horticulture is coordinated with agriculture. Emphasis is placed upon the need of efficient plantsmen for successful horticulture, and suggestions are given for the adequate training of such men.—*H. W. Richey.*

434. HILL, H. A. **The study of botany.** Pharm. Jour. 106: 256–257. 1921.—A discussion is presented with special reference to the Pharmaceutical Syllabus. In the study of both external and internal appearance drawings should be generously used. These should be as large as possible and colored crayons or pencils should be used to emphasize the differentiations. It is believed that few students of elementary botany realize the significance of life histories, though here the real understanding of botanical science begins.—*E. N. Gathercoal.*

435. Howard, W. L. **Coordination in teaching horticulture.** Proc. Amer. Soc. Hort. Sci. 16: 151–154. 1919 [1920].—The author discusses the necessity of coordination in agricultural teaching and the advisability of teaching the sciences from an agricultural point of view and the agricultural subjects in their scientific relationship. This obviously necessitates cooperation between the scientific and technical departments, especially in station projects. It is believed that by judicious coordination of subjects and hearty cooperation of colleges, departments, and individuals, much more can be done and done more rapidly.—*H. W. Rickey.*

436. Merrill, F. A. **How teachers may use Farmers' Bulletin 1125: Forage for the cotton belt.** U. S. Dept. Agric. Dept. Circ. 158. *8 p.* 1921.

437. Merrill, F. A. **How teachers may use Farmers' Bulletin 1148: Cowpeas: culture and varieties.** U. S. Dept. Agric. Dept. Circ. 157. *8 p.* 1921.

438. Merrill, F. A. **How teachers may use Farmers' Bulletin 1175: Better seed corn.** U. S. Dept. Agric. Dept. Circ. 156. *6 p.* 1921.

439. Morstatt, H. **Zur Ausbildung für den Pflanzenschutzdienst.** [Training for plant pathological service.] Zeitschr. Pflanzenkrankh. 31: 89–94. 1921.—The author discusses the principles relative to training for plant pathological service.—*H. T. Güssow.*

440. Percival, John. **Agricultural botany.** *6th ed.* Duckworth & Co.: London, 1921.

441. Schmitt, Cornel. **Bilder aus dem Pflanzenleben. Botanische Plaudereien.** [Pictures from the plant world. Botanical talks.] *113 p.* F. P. Datterer & Cie.: Freising, Germany. *1 mark, 50 pf.*

442. Schmitt, Cornel. **Der biologische Schulgarten, seine Anlage und unterrichtliche Verwertung.** [The biological school garden, its plan and value for instruction.] *2nd ed., 112 p.* F. P. Datterer & Cie.: Freising, Germany. *1 mark, 70 pf.*

443. Schopmeyer, C. H. **How teachers may use Farmers' Bulletin 1087: Beautifying the home grounds.** U. S. Dept. Agric. Circ. 155. *6 p.* 1921.

CYTOLOGY

G. M. Smith, *Editor*
G. S. Bryan, *Assistant Editor*

(See also in this issue Entries 530, 595, 596, 743, 771)

444. Beauverie, J. **La résistance plastidaire et mitochondriale et la parasitisme.** [Plastid and mitochondrial resistance and parasitism.] Compt. Rend. Acad. Sci. Paris 172: 1195–1198. 1921.—Saponin applied to tissues containing plastids and mitochondria causes a degeneration by vacuolization. Resistance to degeneration varies with age and with the tissue concerned. This is particularly marked in the chromoplasts of *Ranunculus Ficariae.* The same effect is produced by infection with *Uromyces Ficariae.* The bearing of this on parasitism and plant pathology is not yet apparent.—*C. H. Farr.*

445. Dangeard, Pierre. **L'évolution des grains d'aleurone en vacuoles ordinaires et la formation des tannins.** [The development of the grains of aleurone in ordinary vacuoles and the formation of tannin.] Compt. Rend. Acad. Sci. Paris 172: 995–997. *Fig. A–I.* 1921.—A study of the tannin formation in the epidermis of the leaves of *Taxus baccata* and the aleurone grains and tannin in seedlings of *Pinus maritima* is reported. Tannin is found to be of vacuolar origin and not mitochondrial, as Politis contends. The aleurone and tannin are both found associated with the vacuolar system in the pine.—*C. H. Farr.*

446. DRAGOIU, J., ET F. VLES. **Les conséquences cytologiques de l'arrêt osmotique de la division cellulaire. [The cytological consequences of the arrest of cell-division by osmotic pressure.]** Compt. Rend. Acad. Sci. Paris 172: 1210–1211. 1921.—Cytological studies are reported supporting experimental results on the effect of osmotic pressure on cell-division [see Bot. Absts. 10, Entry 458].—*C. H. Farr.*

447. D[UDGEON], W[INFIELD]. [Rev. of: GATES, R. RUGGLES. **A preliminary account of the meiotic phenomena in the pollen mother-cells and tapetum of lettuce (Lactuca sativa).** Proc. Roy. Soc. London B. 91: 216–223. *2 fig.* 1920 (see Bot. Absts. 6, Entry 1674).] Jour. Indian Bot. 2: 151–152. 1921.

448. GUILLERMOND, A. **Observations vitales sur le chondriome des végétaux et recherches sur l'origine des chromoplastes et le mode de formation des pigments xanthophylliens et carotiens. Contribution à l'étude physiologique de la cellule. [Intra-vitam observations on the chondriome of plants and researches on the origin of chromoplasts and the mode of formation of xanthophyll and carotin pigments. Contribution to the physiological study of the cell.]** Rev. Gén. Bot. 31: 372–413, 446–508, 532–603, 635–770. *60 pl., 35 fig.* 1919.—A comprehensive treatment is presented of plant chondriosomes with special reference to the formation of xanthophyll and carotin pigments. It includes not only a summary of previous contributions by the author and a consideration of new observations, but also an extensive review of chondriosome literature.—Many species of flowering plants were examined, the most favorable being *Tulipa suaveolens*, *T. Gesneriana*, and *Iris germanica*. Epidermal and mesophyll cells of sepals, petals, bracts, and other floral organs were studied in the living condition as well as by means of the special fixing and staining methods commonly used in the investigation of these objects. Benda's method of fixation followed by iron-haematoxylin or Kull's staining method proved successful. Osmic acid alone also conserves faithfully the cytoplasmic structures.—The cytoplasm is described as a homogeneous, more or less hyaline substance, probably colloidal in nature, filled with chondriosomes in the form of granular mitochondria, short rods, and elongated (sometimes branched) chondrioconts. These elements are formed only by division of preexisting chondriosomes. They are protoplasmic in nature and play an important physiological rôle, since through them alone certain products are elaborated.—In older cells the chondrioconts (rod- or thread-like chondriosomes) increase in size and become plastids. In cellular degeneration the chondrioconts and bodies derived from them break down into granular masses, and with this degeneration is often associated the appearance of fatty substances. The behavior of cytoplasmic inclusions can be studied in the living cells without fixation. Formation of carotin and xanthophyll pigments is associated with the chondriosomes and plastids derived from them. The pigments may occur within these bodies in the form of minute granules or crystals; in some chromoplasts they appear to be in a diffused state. The presence of fat globules and the temporary appearance of starch within the developing chondrioconts are frequently associated with pigment formation. There seems, however, to be no constant relationship between oil formation, starch formation, and the development of chlorophyll and other pigments.—The author argues strongly for the conception of the plant chondriosome as a self-perpetuating cell organ concerned in the development of plastids and in the elaboration of starch, oil, and pigments in a manner analogous to similar phenomena in animal cells. He replies to the objections advanced by other writers against this view and regards as inadequate the evidence for the existence of 2 or more distinct categories of chondriosomes and for their nuclear origin.—*L. F. Randolph.*

449. LEVY, F. **Die Kernverhältnisse bei parthenogenischen Froschen. [Nuclear phenomena in parthenogenetic frogs.]** Sitzungsber. Preussisch. Akad. Wiss. Berlin 1920: 417–425. 1920.

450. LICENT, E. **Sur la structure et l'évolution du noyau dans les cellules du méristème de quelques Euphorbiacées. [Structure and development of the nuclei of meristematic cells of certain Eurphorbiaceae.]** Compt. Rend. Acad. Sci. Paris 172: 1063–1066. 1921.—Roottips, stem tips, young leaves, pollen-mother-cells, and developing embryo-sacs were studied. The nucleole sometimes persists through the anaphases and then disappears without leaving

a trace. In some of these cases it first fragments, the fragments going to the poles and behaving as huge chromosomes. In the pollen-mother-cells of *Mercurialis* the chromosomes function in an analogous fashion to these nucleoles.—*C. H. Farr.*

451. Litardière, R. de. **Remarque au sujet de quelques processus chromosomiques dans les noyaux diploidiques du Podophyllum peltatum L. [Remarks on certain chromosome processes in the diploid nuclei of Podophyllum peltatum.]** Compt. Rend. Acad. Sci. Paris **172**: 1066–1068. 1921.—Alveolization of the daughter chromosomes in the anaphases occurs in this species. Anastomoses between adjacent chromosomes in telophase are not as interpreted by Overton in 1909 but are formed by the fusion of pseudopodia-like projections from the chromosomes. Twelve chromosomes represent the diploid number as opposed to 16 reported by Overton and Mottier in American material. This difference may indicate a varietal difference.—*C. H. Farr.*

452. Politis, J. **Sur les corpuscules bruns de la brunissure de la vigne. [On the brown corpuscles of brunissure of the grape.]** Compt. Rend. Acad. Sci. Paris **172**: 870–873. 1921.—Among the causes that have been suggested for the burnishing of the grape are animal parasites, fungi, myxomycetes, and physiological disturbances. Minute intracellular bodies, yellow to brown in color, are found to be present which react to tests for tannin and also appear as mitochondria when treated with the Regaud or the Benda method.—*C. H. Farr.*

453. Politis, J. **Sur l'origine mitochondriale des pigments anthocyaniques dans les fruits [On the mitochondrial origin of the anthocyan pigments of fruits.]** Compt. Rend. Acad. Sci Paris **172**: 1061–1063. 1921.—In the epidermis of the fruits of *Vitis vinifera*, *Solanum Melongena*, and *Convallaria japonica* the anthocyan is formed from the tannin in the mitochondria.—*C. H. Farr.*

454. Potts, F. A. **A note on vital staining.** Proc. Cambridge Phil. Soc. **20**: 231–234 1921.

455. Riker, A. J. **Chondriomes in Chara.** Bull. Torrey Bot. Club **48**: 141–148. *Pl. 3.* 1921.—Two species of *Chara* were studied, and the chromatic granules (prochondriomes) were found to appear on the central plate in anaphase, taking their origin in the nucleolus and migrating into the cytoplasm to become chondriomes. Chondriomes can thus arise as nuclear extrusions, but also by fission from other chondriomes. Prochondriome contents seemed not to differ, in the actively growing tip, in purely vegetative cells, and gamete-producing cells; extrusion of prochondriomes "is apparently not connected with nuclear degeneration or differentiation of the germ and vegetative cells."—*P. A. Munz.*

456. Rivett, M. F. **The structure of the cytoplasm in the cells of Alicularia scalaris Card.** Ann. Botany **32**: 207–214. *Pl. 6, 3 fig.* 1918.

457. Sharp, Lester W. **An introduction to cytology.** *xiii + 452 p., 159 fig.* McGraw-Hill Book Co.: New York, 1921.

458. Vlès, F., et J. Dragoiu. **Sur la pression osmotique d'arrêt de la division cellulaire. [Concerning the effect of osmotic pressure in arresting cell-division.]** Compt. Rend. Acad. Sci. Paris **172**: 1127–1130. 1921.—The increase in external osmotic pressure, without an appreciable variation in the electrolytic dissociation, retards the segmentation of the sea urchin egg. An increase in osmotic pressure of 11 atmospheres stops cytoplasmic division, but not nuclear division, which continues up to 23 atmospheres above normal. The work done in successive divisions of the egg is calculated to be as follows: 1st division, 4.02 ergs; 2nd division, 1.66 ergs; 3rd division, 0.81 ergs; 4th division, 0.28 ergs.—*C. H. Farr.*

459. Ward, Cutler D. **The cytological problems arising from the study of artificial parthenogenesis. Part II.** Sci. Prog. [London] **16**: 71–78. 1921.

ECOLOGY AND PLANT GEOGRAPHY

H. C. Cowles, *Editor*
Geo. D. Fuller, *Assistant Editor*

(See also in this issue Entries 399, 402, 556, 577, 580, 581, 583, 592, 594, 601, 602, 603, 606, 607, 608, 609, 611, 625, 642, 745, 747, 751, 752, 797, 801, 802, 803, 804, 805, 806, 807, 809, 815, 816, 819, 823, 835, 848)

GENERAL, FACTORS, MEASUREMENTS

460. T., E. N. **Botany at the British Association.** Nature 104: 520–521. 1920.—Brief abstracts of various papers are presented including the following: H. H. Thomas on desert flora of western Egypt; H. W. Monckton on flora of London Clay; J. C. Willis on northern invasions of New Zealand; Godfery on orchids of Hants and Dorset (members of the section were privileged to see on their expedition one of the rare ones mentioned, *Malaxis paludosa*); W. Brierley on species concept in fungi; R. R. Gates on mutational versus recapitulatory characters; Miss Saunders on inheritance in *Matthiola*; Scott on relations of seed plants to higher cryptogams; Salisbury on monocotyledonous features of the Ranunculaceae; Miss Prankerd on movable cell inclusions; M. C. Rayner on mycorhiza and Ericaceae; Priestley on theoretical consideration of root pressure.—*O. A. Stevens.*

461. Thiessen, A. H. **Notes on the vertical distribution of temperature.** Trans. Utah Acad. Sci. 1: 55–60. 1918.—This paper was presented to the Academy in April, 1911.—*H. C. Cowles.*

STRUCTURE AND BEHAVIOR

462. Agharkar, Shankar. **Die Verbreitungsmittel der Xerophyten, Subxerophyten und Halophyten des nordwestlichen Indiens und ihre Herkunft. [Distributional mechanism of xerophytes, subxerophytes, and halophytes of northwestern India, and origin of the mechanisms.]** Bot. Jahrb. 56 (Beibl. 124): 1–41. 1920.—An historical account is given in which it is noted that there have been 2 groups of publications, those dealing with structure of the mechanisms, and the other with operation. The region studied is described in detail. It is semidesert in nature, and except along streams most parts are treeless plains. The climate is analyzed, and tables are given showing the conditions existing. A brief description of the resulting flora is given, the fauna also being mentioned. The distributional mechanisms are divided into active and passive. The active are of 2 sorts, those in which the mechanism is connected with the pericarp, and those in which it is not. The passive are of 5 types adapted to secure distribution respectively by wind, animals, water, and by the opening of seed vessels so as to promote distribution by shaking due to wind or animals; the first 2 are subdivided. The species are classified under these heads in tables. At the end of each table the results are analyzed. Light is thrown on the reasons for the migration of various species from other nearby countries into this region. About 5 per cent of the species are distributed by active means, 50 by wind, 30 by animals, and 15 per cent by being shaken by wind or animals. Of the 260 species, 37 are widely distributed, 46 are Indo-Malayan, 93 Arabo-African, 38 Mediterranean, 1 central-Asiatic, and 45 endemic.—*K. M. Wiegand.*

463. Andrews, E. F. **Habits and habitats of the North American Resurrection Fern.** Torreya 20: 91–96. 1920.—The most frequent hosts of *Polypodium polypodioides* (L.) Hitchc. in the southern coastal plain are the post-oak, elm, and tulip-tree. The fern is not a parasite but seems to establish a symbiotic relation with a certain soft moss. Instead of growing in secluded woods, it is found most often on the borders of roads and about dwellinsg. The scurfy coating on the under surface of the fronds checks evaporation and explains the drought-resisting qualities of the plant. A mat of the plants collected on December 30 showed no signs of withering until January 13, and was not completely withered until 18 days later. On April

11, May 17, and June 15 specimens detached from the mat and exposed to rain revived within 12–24 hours. On October 30 a specimen exposed to a warm mist revived sufficiently in 12 hours to show that it was still alive, and in 12 hours more all the fronds were expanded. On March 8, after more than 14 months without water, 2 fronds were still able to expand, after which the plant did not revive.—*J. C. Nelson.*

464. Bonnier, G. **Nouvelles observations sur les cultures expérimentales à diverses altitudes et cultures par semis.** [New observations on experimental cultures at various altitudes and seed cultures.] Rev. Gén. Bot. 32: 305–326. *2 pl., 4 fig.* 1920.—An account is given of the effects of climate upon perennial lowland plants cultivated for more than 30 years at altitudes from 700 to 2400 m. in the Alps and Pyrenees. To eliminate the effect of initial variations fully developed plants were divided into a number of parts, and these were transplanted to various altitudes. The following are some of the conclusions reached: In general, all lowland plants belonging to species naturally able to tolerate the differences in altitude develop well under alpine conditions. Alpine species from other parts of the world grow well in analogous situations in the Alps and Pyrenees. At the end of 30 years in high altitudes nearly all lowland plants have assumed the habit and anatomical structure identical with that of plants of the same species already growing at these altitudes. Complete adaptation of this sort is accomplished in 8 to 10 years by some species, whereas others require more than 25 years; 58 species which have undergone such changes are listed.—Several alpine plants (17 listed) have become so modified by the alpine climate that they are indistinguishable from forms previously described as distinct species. For example, *Helianthus vulgare* Gaertn. after 30 years at 2400 m. has assumed all the characters of *H. grandiflorum* DC.—All species of extensive altitudinal range have an optimum altitude for their development. With increasing altitude the leaves become greener and the flowers more highly colored up to a certain level; beyond this level the colors become less intense, though some adaptive characters continue to become more accentuated. Some changes appearing at once after transplantation disappear in a few years; conclusions are valid only if based on observations extending over many years.—Plants belonging to typical alpine species rapidly lose some of their alpine characters or even perish when transferred to too low altitudes. The same is true of lowland species grown at high altitudes and then returned to the plains. Some annual lowland species become biennial or perennial at high altitudes; the perennial habit represents one of the principal alpine adaptations.—By a number of experiments with seeds germinated at low and high altitudes it is shown that the seedling stages also show striking adaptations to alpine conditions. The most conspicuous changes are the dwarfing of all parts and the alteration in the shape and vesture of the leaves.—*L. W. Sharp.*

465. Brewster, A. A. **Pollination of Persoonia lanceolatus by the bee, Halictus.** Australian Nat. 4: 157–158. 1920.

466. Hamilton, A. A. **Reproduction of plants from leaves.** Australian Nat. 4: 149–150. 1920.

VEGETATION

467. Bews, J. W. **Plant succession and plant distribution in South Africa.** Ann. Botany 34: 287–297. 1920.—The operation of Willis' "age and area" law is profoundly modified under conditions of extreme climatic variation such as obtain in South Africa. The author attempts to account for certain phases of plant distribution within the range under consideration by the application of successional principles. He finds that "species with a wide distribution are usually found in an early stage of the plant succession." He regards this as an "ecological amplification" of Willis' law applicable in regions characterized by great variations in climate. It is pointed out that certain pioneer species are not widely distributed due to the fact, in some cases at least, that their spread is prevented by the presence of more stable plant communities. Furthermore, there are certain large classes of species having a restricted distribution that "belong of necessity to climax or sub-climax stages of succession."—*P. D. Strausbaugh.*

468. DUDGEON, WINFIELD. **A contribution to the ecology of the Upper Gangetic Plain.** Jour. Indian Bot. 1: 9–10. 1920.—A study of vegetative types and successions based on observations through several seasons in a region about Allahabad is reported. The climatic factors produce 3 distinct seasons: (1) Rainy season, July–Sept., with high rainfall, low insolation, high temperature, high humidity; (2) cold season, Oct.–Feb., with low rainfall, high insolation, low temperature, high humidity; (3) hot season, Mar.–June, with low rainfall, high insolation, high temperature, low humidity, and high winds.—The biotic feature influences the vegetation as much as does the climatic. The rural population of the region is 530 per square mile; grazing domestic animals number 470 per square mile. This causes marked and continual retrogression from the climatic climax. Seasonal succession is distinct, the vegetation being luxuriant in the rainy season, moderately luxuriant with different types prevailing in the cold season, and sparse in the hot season.—Hydrarch topographic succession is obscured by the interference of human factors but it presents in general the following stages: (1) aquatic, (2) wet meadow, (3) dry meadow, (4) thorn scrub poorly developed. If the retrogressive influence of biotic factors were removed it seems clear that successions would progress through (5) thorn scrub fully developed, (6) pioneer monsoon deciduous forest, (7) climatic climax monsoon deciduous forest.—*L. A. Kenoyer.*

469. HARVEY, LEROY H. **Some phytogeographical observations in Lake County, Michigan.** Michigan Acad. Sci. Ann. Rept. 21: 213–217. 1919.—The author holds that the northern half of the southern peninsula of Michigan represents "a great tension zone in which the northern outposts of the deciduous climax forest formation and the southern relicts of the northeastern evergreen forest formation overlap and intermingle, thus becoming competitors for occupation." A study of soil and atmospheric conditions proves inadequate to explain present distributional conditions, and renders it probable that succession has been abbreviated in most, if not all, of the tree associations. He believes that the original upland forest associations have been more the result of preoccupation and self-perpetuation than of a well-marked successional development. In general he believes that "any region should be classified upon the basis of the highest ecological type which may find expression therein." From these considerations, the presence of numerous areas of hardwood or mixed hardwood formations in this region of conifers would seem to link it up with the deciduous climax formation to the south.—*H. T. Darlington.*

470. HASTINGS, GEORGE T. **The vegetation of a cinder field.** Torreya 20: 96–100. 1920.—In the summer of 1916 an area of some 3 acres on the west shore of the Hudson River opposite Hastings, New York, was filled in with ashes and rubbish from 1 to 6 feet in depth, and over this a layer of cinders 6 inches to a foot in thickness was placed. In the summer of 1917 the area became well covered with vegetation; the next year, however, the area was covered with a layer of clayey soil, and but few of the original plants reappeared. In 1917, 96 species of flowering plants appeared on the area. This was distinctively a weed flora, only 6 of the species belonging to the flora of the adjacent hillside. Only 29 per cent of the species were native, and over half were annuals. The grasses and composites made up more than 40 per cent of the species. Many of the plants would have survived for many seasons had not the cinders been covered the following season. A complete list of the species observed is appended.—*J. C. Nelson.*

471. PHILLIPS, E. PERCY. **A preliminary report on the veld-burning experiments at Groenkloof, Pretoria.** South African Jour. Sci. 16: 285–299. *Pl. 31–33 and diagrams.* 1920.—The burning of the veld tends to encourage the flowering of many plants, particularly hemicryptophytes. There appears to be a definite life history in the development of the succession and the formation of vernal aspect societies. Soil protected by vegetation does not exhibit such extremes of heat and cold as bare soil. The water content of soil covered with vegetation does not fluctuate between very high and very low extremes; it is more stable in this respect than bare soil.—*E. P. Phillips.*

472. RAMALEY, FRANCIS. **Some mountain plant communities on sandy soil.** Plant World 22: 313–328. *3 fig.* 1919.—An account is given of the vegetation on a sandy area near George-

town, Colorado, in Clear Creek Cañon at an altitude of 8500 feet. Four habitats are considered: sand, sand-gravel slopes, rock wash, and rock ridges. Three associations occur on sand: (1) shrub association, (2) wheat-grass association, and (3) short-grass association. The principal shrubs in the 1st of these associations are *Symphoricarpos vaccinoides*, *Rhus trilobata*, *Ribes inebrians*, and *Chrysothamnus linifolius*. The shrub communities are considered as intermediate between grassland and coniferous forest, and it is pointed out that well compacted soil tends to forests on steeper slopes, and to grasslands on more level areas. A list of 64 species found on the sandy area is given.—*Charles A. Shull.*

473. RAMALEY, FRANCIS. **Vegetation of undrained depressions on the Sacramento plains.** Bot. Gaz. 68: 380–387. *Fig.* 1919.—The numerous depressions of the Sacramento plains have a very fine-graded soil, where water stands during the period of winter rain and even into early spring. The vegetation is very different from that of the usual grassland of the region, being composed of very few species, with practically no introduced weeds. The depressions usually show a central area and a marginal zone, the former characterized by a dense growth of *Allocarya* or *Baeria*, and the latter by *Floerkea Douglasii* and *Deschampsia danthonioides.* Subordinate species of both areas are noted and the seasonal changes indicated. A systematic list is given of 29 species, 10 of which are marked as characteristic, 8 as frequent, and 11 as merely occasional.—*Francis Ramaley.*

474. RUSSELL, W. **Esquisse sur la végétation d'un coin du Gévaudan granitique. [Sketch of the vegetation of a corner of the granitic Gévaudan.]** Rev. Gén. Bot. 32: 226–229, 256–269. *1 fig.* 1920.—A brief description is given of the physiography and vegetation of the high undulating plateau between the mountains of Aubrac and the Margeride. The vegetation is divided into 4 physiognomic groups inhabiting respectively the prairies, woods, waste places, and cultivated lands; lists of species constituting each group are given. The prairies are particularly rich in montane species.—*L. W. Sharp.*

475. SHREVE, FORREST. **A comparison of the vegetational features of two desert mountain ranges.** Plant World 22: 291–307. *7 fig.* 1919.—A description of the physiographic features of the Pinaleno mountains is presented, and a comparison of the general vegetational and floristic features of the Pinaleno range and the Santa Catalinas. The main differences noted are due to the higher altitude, and the more sharply cut and better watered cañons of the Pinalenos. The higher altitude leads to more extensive development of a type of forest sparingly represented at the highest altitudes of the Santa Catalinas; and the well watered cañons lead to a more conspicuous interdigitation of lowland and mountain vegetation on the slopes. Comparative rainfall records for the two ranges are given for 1917, and lists of species found in the Pinaleno mountains that are absent from the Santa Catalinas. Certain species found in both ranges raise the question as to the means of dispersal of species from range to range across the arid lowlands between them. The floristic differences indicate a secular movement of species from the larger and higher ranges to the lower and more isolated ones, with rapid impoverishment of the flora as the latter are approached.—*Charles A. Shull.*

FLORISTICS

476. ANONYMOUS. **The botanical survey of the Union of South Africa.** Kew Bull. 1919: 399–403. 1919.

477. BAILEY, JOHN W. **Adventures in mossland:—Polytrichadelphus Lyallii Mitt.** Bryologist 23: 49–50. 1920.—This is a popular account of the collection of a rare moss upon Mt. Rainier, with some notes upon its surroundings.—*E. B. Chamberlain.*

478. BARNOLA, JOAQUIN MARIA DE. **Notas fitostáticas sobre la vegetación briológica de las cercanías del Lago de Bañolas. [Ecologic notes upon the bryophytes of the neighborhood of Lake Bañolas.]** Broteria Ser. Bot. 18: 64–73. 1920.—Lake Bañolas is near the town of the same name in northeast Spain. It apparently occupies a much smaller basin than formerly,

present dimensions being about 0.5 by 2 km. The region is underlain by limestone ("terreno nummulítico") with some sandstone, and considerable travertine from the lake. There are many fissures and faults in the neighborhood as well as small fluctuating lakes.—A list of 31 mosses and 9 hepatics is given, in each case with short notes upon habitat, soil preference, and general distribution. One hepatic, *Lejeunea calcarea* Lib. var. *Rosettiana* Mass, is noted as new to the flora of Spain.—*E. B. Chamberlain.*

479. BEAN, W. J. **Abraham's Oak.** Kew Bull. 1919: 233–236. *1 fig.* 1919.—*Quercus coccifera palaestina* from Jerusalem is discussed.—*E. Mead Wilcox.*

480. BRITTON, N. L. **A botanical expedition to Trinidad.** Jour. New York Bot. Gard. 21: 101–118. 1920.—Besides a general narrative of the expedition, the article presents general accounts of the vegetation of Trinidad and the neighboring islands. This includes tropical rain-forest, open savannas, and coastal deserts with abundant cacti.—*H. A. Gleason.*

481. COBURN, LOUISE H. **Flora of Birch Island in Attean Pond.** Rhodora 22: 129–138. 1920.—Attean Pond is one of the Moose River chain of lakes which extend from west to east across the northern part of Somerset County, Maine, draining into the Kennebec by way of Moosehead Lake. Birch Island, the largest in this lake, has an area of something over 25 acres, is very irregular in outline, and appears to have a backbone of granite boulders,—glacier-borne from the rocky heights to the north,—while the sand and gravel of the beaches show the same origin. The larger part of the island is covered with a nearly pure stand of fir which is coming up under and slowly replacing an older white birch forest. The flora of the island divides itself naturally into 7 associations: (1) The forest flora; (2) flora of the rocky shore below high water line; (3) flora of the marshes; (4) flora of the gravel beaches; (5) water flora of the coves; (6) flora of the cleared ground; (7) waste ground flora. A list of species is given for each of these associations with an additional short list of plants found in Attean Township outside of Birch Island.—*James P. Poole.*

482. DARLINGTON, H. T. **Distribution of the Orchidaceae in Michigan.** Michigan Acad. Sci. Ann. Rept. 21: 239–261. *1 pl.* 1919.—The greater number of species of the Orchidaceae of Michigan occur south of the Jack Pine Region; a few are found in the Upper Peninsula and in the northern part of the Lower Peninsula. *Cytherea* is one of the distinctly boreal species. The rarest species known in the state is *Triphora trianthophora.* The orchid flora of the state comprises 70 per cent of the total number of species known within the northeastern United States and Canada. A key to the genera and species and full notes on the distribution of the species are given.—*Bertha E. Thompson.*

483. FINCKH, H. E. **On Riccia fluitans.** Australian Nat. 4: 151. 1920.—The occurrence of the species in 2 localities is mentioned.—*T. C. Frye.*

484. FITZPATRICK, T. J. **The fern flora of Nebraska—II.** Amer. Fern Jour. 10: 33–44. 1920.—The article contains an annotated list of 21 species of pteridophytes, distributed among 14 genera and 6 families.—*F. C. Anderson.*

485. GINZBERGER, A. **Zwei neue Standorte der gefeldert-rindigen Buche, Fagus silvatica var. quercoides Pers., in Mittel Italien und Slavonien.** [Two new stations for the groove-barked beech, Fagus silvatica var. quercoides Pers., in central Italy and in Slavonia.] Naturwiss. Zeitschr. Forst- u. Landw. 18: 39–41. 1920.—Previous reports had confined the range of this tree to southern, central, and western Germany, and 1 stand in southern Hungary. The tree recently identified in Italy was found in the southern Abbruzzia, the other in the highlands of western Slavonia in 1918; both were old, the latter evidently decadent. The author also discovered 2 beautiful examples of var. *quercoides* in 1919 in the Lainz Zoological Park near the western city limits of Vienna.—*J. Roeser.*

486. GRAVES, E. W. **The fern flora of Alabama.** Amer. Fern Jour. 10: 65–82. *Pl. 1, fig. 1–2.* 1920.—The author lists 69 species of pteridophytes distributed among 23 genera and 3 families.—*F. C. Anderson.*

487. Harper, Roland M. **Southern Louisiana from the car-window.** Torreya 20: 67-76. 1920.—The vegetation of southern Louisiana has not been extensively described. The author has made 2 trips across the territory, the 1st in July, 1915, from New Orleans westward on the Southern Pacific, and the 2nd in August, 1918, from New Orleans to Baton Rouge, and thence westward to the Sabine River. Five regions are enumerated: the Sugar-Cane Region, the Cotton Region, the Prairies, the Long-Leaf Pine Region, and the Hammock Forests. Lists of species observed from the train in passing through each of these regions are given; the determination in many cases is merely conjectural.—*J. C. Nelson.*

488. Hitchcock, A. S. **Report on a recent trip to British Guiana.** Jour. New York Bot. Gard. 21: 129-137. *Pl. 248-249.* 1920.—The author presents general information on the climate and vegetation of the region, and describes in detail his method of drying plants for herbarium specimens.—*H. A. Gleason.*

489. Monckton, Horace W. **The flora of the district of the London clay.** [Abstract.] Rept. British Assoc. Adv. Sci. 1919: 335. 1920.

490. Schlechter, R. **Die Verbreitung und das Auftreten der Orchideen in Europa nebst Winken über ihre Kulture. [The distribution and occurrence of orchids in Europe together with hints as to their culture.]** Orchis 13: 19-25, 35-40. 1919.—Some 120 species of native orchids occur in Europe; many of these are worthy of cultivation. The various genera and species are listed with notes concerning distribution and culture.—*E. B. Payson.*

491. Small, J. K. **Cypress and population in Florida.** Jour. New York Bot. Gard. 21: 81-86. *Pl. 245-247.* 1920.—The cited ranges of *Taxodium distichum* and *T. ascendens* cover only the portions of Florida already settled. Both species actually extend much farther south. The plates illustrate the habit and leaf form of both species.—*H. A. Gleason.*

492. Small, J. K. **Of grottoes and ancient dunes.** Jour. New York Bot. Gard. 21: 25-38, 45-54. *Pl. 241-244.* 1920.—The author gives extended notes on a 1200 mile trip through various parts of Florida, describing the prevailing vegetation and citing numerous species. The fern grottoes are occupied by a dense and luxuriant growth of 14 species of ferns. J. H. Barnhart adds, in footnotes, brief biographies of John Bartram, William Bartram, William Baldwin, Severn Rapp, Mary Evans Francis, Cameron Mann, A. H. Curtiss, and John Donnell Smith.—*H. A. Gleason.*

493. T., W. B. **Carex riparia, var. gravilis in Britain.** Kew Bull. 1920: 141. 1920.

494. Taylor, Norman. **A rare palm from Cuba in the conservatories.** Brooklyn Bot. Gard. Rec. 9: 101-102. 1920.—A specimen of this palm, *Coccothrinax crinita* (Griseb. & H. Wendl.) Becc. (*Thrinax crinita* Griseb. & H. Wendl.), was discovered by Charles Wright in eastern Cuba "during our Civil War." Until quite recently no living specimen was known. The specimen in the Brooklyn Botanic Garden was collected on March 17, 1894, by R. D. Hoyt, of Clearwater, Florida, in western Cuba (Pinar del Rio). It is suggested that the original record may have been in error.—*C. S. Gager.*

495. Thomas, H. Hamshaw. **On the desert flora of western Egypt.** [Abstract.] Rept. British Assoc. Adv. Sci. 1919: 332. 1920.

496. Turrill, W. B. **Botanical exploration in Chile and Argentina.** Kew Bull. 1920: 57-66. 1920.

497. Turrill, W. B. **Botanical results of Swedish South American and Antarctic expeditions.** Kew Bull. 1919: 268-279. 1919.

498. Weatherby, C. A. **A European primrose in New England.** Rhodora 22: 143. 1920.—The discovery of a colony of *Primula officinalis* (the English cowslip) well established

on a shady river bank in Salisbury, Connecticut, is reported. Apparently this colony was started by seed thrown out with rubbish. A station has also been reported from Greene, Maine. The author reports that a search of the literature has failed to disclose any previous record of the plant occurring spontaneously in the eastern U. S. A., although in his Catalogue of the Canadian Plants, John Macoun reports it as well established near North Sydney, Cape Breton, and near Victoria, Vancouver Island.—*James P. Poole.*

499. WILLIS, J. C. **On the floras of certain islets outlying from Stewart Island (New Zealand).** Ann. Bot. 33: 479–484. *1 map.* 1919.—From a survey of 2 papers by Poppelwell and another by Cockayne the author gleans some further facts which he presents briefly as evidence of the "extraordinary applicability of his "age and area" hypothesis. He concludes that for restricted areas such as are dealt with here "age and area can be relied upon to explain the general composition of any of the floras that occur."—*P. D. Strausbaugh.*

500. WILLIS, J. C. **The northern invasions of New Zealand with special reference to Lord Howe Island.** [Abstract.] Rept. British Assoc. Adv. Sci. 1919: 333. 1920.

501. WILSON, E. H. **A phytogeographical sketch of the ligneous flora of Formosa.** Jour. Arnold Arboretum 2: 25–41. 1920.—The topography and geological formation and the climatic factors of the island, which is 244 miles long and 75.6 miles broad in its widest part and covers an area of 13,908 square miles, are briefly discussed. The island is very mountainous and its central range stretching from north to south reaches an elevation of 3985 m. on Mt. Morrison, which carries snow for fully 6 months. In general the climate is warm-temperate and the rainfall varies between 130 inches in the north and 70 inches in the south. A short history of the botanical explorations of the island is given. The total number of flowering plants and vascular cryptogams recorded up to 1918 amounts to 3359 species and 57 varieties belonging to 1173 genera and 169 families, according to Hayata. The most important trees and shrubs are named and briefly characterized. The alluvial plains are nearly all under cultivation, but the high mountains are clothed with evergreen forests. The forest is similar in character from near sea-level to 1800 m.; it is a rain-forest and nearly all woody plants are evergreen. Above 1000 m. Lauraceae and Fagaceae are dominant types; from 1800–3000 m. conifers prevail mixed with broadleaf trees, mostly evergreen; above 3000 m. broad-leaf trees decrease and shrubs, particularly those belonging to northern genera, increase. The tree limit on Mt. Morrison is at 3800 m. Palms are represented in Formosa by only 5 genera, and only 3 species are common. Pinaceae are represented by 11 and Taxaceae by 3 genera. Among the Pinaceae, *Taiwania cryptomeriodes* is particularly noteworthy; it is related and similar to *Sequoia*, and is the tallest tree of Eastern Asia, attaining a height of 200 feet; the 2 species of *Chamaecyparis* are nearly as tall. Some northern genera, such as *Alnus*, *Carpinus*, *Fagus*, *Ulmus*, and *Malus*, reach the southern limit of their range. The affinity of the flora is with that of western and southwestern China, though some important types, such as Nyssaceae, *Eucommia*, *Euptelia*, *Cercidiphyllum*, *Magnolia*, and *Hamamelis*, are absent; it also shows close relationship to that of Japan, the Liukiu Islands, and the coastal provinces of China. In the south some Philippine species occur. [See also Bot. Absts. 4, Entries 1758, 1759.]—*Alfred Rehder.*

502. ZENARI, SILVIA. **Primo contributo alla Flora della Val Cellina (Fruili Occidentale).** [First contribution to the flora of the valley of Cellina.] Nuova Gior. Bot. Ital. Nuova Ser. 27: 11–37. 1920.—The author gives a list of plants, with habitat and elevation of the latter, collected in the valley of Cellina, the westernmost part of the pre-alpine basin of the Fruili.—*Ernst Artschwager.*

APPLIED ECOLOGY

503. SCOTT, W. R. M., AND E. J. PETRY. **Correlation of variation in resin content of Podophyllum with certain habitats.** Michigan Acad. Sci. Ann. Rept. 21: 225–231. 1919.—The 3 habitats selected varied as to shade, air movement, soil moisture, humus, and associated plants. The study was undertaken to lower if possible the cost of production by determining

the habitat producing plants yielding most resin for a given amount of material and a minimum amount of labor in collecting the rhizomes. Extraction methods are noted. Soil analyses and habitat characteristics are given in tabular detail. Of the 3 habitats, No. 1 was considered the best, all things considered. No. 2 produced the greatest rhizome growth but the resin content was lowest. In No. 1, conditions were such that good growth was made and the resin content was high enough to be profitable. It is added that further work would undoubtedly develop economic relations between grower and manufacturer.—*R. P. Hibbard.*

FOREST BOTANY AND FORESTRY

RAPHAEL ZON, *Editor*
J. V. HOFMANN, *Assistant Editor*

(See also in this issue Entries 469, 485, 725, 772)

504. ANONYMOUS. **In the open. The national forests of Washington.** U. S. Dept. Agric. Dept. Circ. 138. *78 p., illus.* 1920.

505. ANONYMOUS. **Pisgah national game preserve. Regulations and information for the public.** U. S. Dept. Agric. Dept. Circ. 161. *11 p.* 1921.

506. ANONYMOUS. **Forestry in France.** [Rev. of: WOOLSEY, T. S., JR. **Studies in French forestry; with two chapters by** W. B. GREELEY. *xxvi + 550 p.* John Wiley and Sons: New York; Chapman and Hall: London, 1920.] Nature 107: 548–549. 1921.

507. COOK, I. W., H. SCHMITZ, AND L. A. GRANT. **The availability of western wood oils for flotation concentration.** Univ. Idaho Bull. 16^{13}: 1–22. 1921.—Douglas fir (*Pseudotsuga taxifolia*), western yellow pine (*Pinus ponderosa*), lodgepole pine (*Pinus contorta* var. *Murryana*), western larch (*Larix occidentalis*), western red cedar (*Thuya plicata*), and white fir (*Abies grandis*) wood was destructively distilled by the Prichard process and the resulting oils tested for their flotation properties. The oil produced from western yellow pine not only gives good flotation results, but can be produced on a commercially profitable basis.—*Henry Schmitz.*

508. DAVIDSON, JOHN D. **More about fir sugar.** Amer. Bee Jour. 61: 233–234. *Fig. 1.* 1921.—It is possible that British Columbia will replace Turkestan and Persia as a source of the rare sugar, melezitose.—*J. H. Lovell.*

509. SCHMITZ, H., AND A. S. DANIELS. **Studies in wood decay I. Laboratory tests on the relative durability of some western coniferous woods with particular reference to those growing in Idaho.** Univ. Idaho School of Forest. Bull. 1. *11 p.* 1921.—The wood of western white pine, western yellow pine, Douglas fir, western larch, western red cedar, white fir, and Engelmann spruce was subjected to the action of *Polyporus lucidus, Lenzites saepiaria, Fomes pinicola, Merulius pinastri, Polystictus versicolor, Pleurotus sapidus, Echinodontium tinctorium, Trametes pini, T. carnea,* and *Lentinus lepideus* for 10½ months and the amount of decay noted. The conclusion is reached that white fir and Engelmann spruce are not as susceptible to decay as generally thought.—*Henry Schmitz.*

GENETICS

George H. Shull, *Editor*
James P. Kelly, *Assistant Editor*

(See also in this issue Entries 403, 405, 457, 459, 460, 565, 574, 649, 650, 661, 668, 816, 832, 833, 837)

510. Anonymous. [Rev. of: Rawes, A. N. **Sterility in plums.** Jour. Roy. Hort. Soc. **46**: 353. 1921.] Gard. Chron. **70**: 107. 1921.

511. Alverdes, F. [German rev. of: Alverdes, F. **Das Verhalten des Kerns der mit Radium behandelten Spermatozoen von Cyclops nach der Befruchtung.** (The behavior of the nucleus of radium-treated spermatozoa of Cyclops after fertilization.) Arch. Entwicklungsmech. **47**: 375–398. 1921.] Zeitschr. Indukt. Abstamm.- u. Vererb. **26**: 301. 1921.

512. Alverdes, F. [German rev. of: Haecker, V. (1) **Entwicklungsgeschichtliche Eigenschaftsanalyse (Phänogenetik). Gemeinsame Aufgaben der Entwicklungsgeschichte, Vererbungs- und Rassenlehre.** (Developmental analysis of characters (Phaenogenetics). General problems of development, heredity and eugenics.) *344 p., 181 fig.* G. Fischer: Jena, 1918 (see Bot. Absts. 1, Entry 1216; also 3, Entries 45, 2184). (2) **Über die Ursachen regelmässiger und unregelmässiger Vererbung.** (On the causes of regular and irregular inheritance.) Flugschr. Deutsch. Ges. Zücht. 50. *20 p.* Berlin, 1920. (3) **Über weitere Zusammenhänge auf dem Gebiete der Mendelforschung.** (On further correlations in the field of Mendelian investigation.) Pflügers Arch. Gesam. Physiol. **181**: 149–169. 1920.] Zeitschr. Indukt. Abstamm.- u. Vererb. **26**: 302–308. 1921.

513. Alverdes, F. [German rev. of: Just, Günther. **Der Nachweis von Mendel-Zahlen bei Formen mit niedriger Nachkommenzahl. Eine empirische Prüfung der Geschwister und Probandenmethode Weinbergs auf Grund von Kreuzungsversuchen mit Drosophila ampelophila Löw.** (The determination of Mendelian ratios in forms with low number of offspring. An empirical test of Weinberg's method on the basis of crossing experiments with Drosophila ampelophila Löw.) Arch. Mikrosk. Anat. **94**: 604–652. 1920.] Zeitschr. Indukt. Abstamm.- u. Vererb. **26**: 308–310. 1921.

514. Alverdes, F. [German rev. of: Poll, Heinrich. **Mischlingsstudien VIII. Pfaumischlinge, nebst einem Beitrag zur Kern-Erbträger-Lehre.** (Hybridization studies VIII. Peafowl hybrids and a comment on the theory of nuclear bearers of heredity.) Arch. Mikrosk. Anat. **94**: 365–458. *5 fig.* 1920 (see Bot. Absts. 7, Entry 1819).] Zeitschr. Indukt. Abstamm.- u. Vererb. **26**: 310–312. 1921.

515. Bartos, W. **Der Einfluss der Veredlung auf den Wert der Rübe.** [The influence of breeding on the value of the beet.] Zeitschr. Zuckerindust. Böhmen **42**: 299–302. 1918.—The author presents a summary of data collected between 1897 and 1916 for Bohemian beet crops. The steady rise in sugar percentage as well as in average weights of roots and foliage is credited to the plant breeder, for even where greater fertilization is partially concerned the plants must be of a kind capable of profiting by it. [From anonymous review in Zeitschr. Pflanzenzücht. **6**: 98. 1918.]—*J. P. Kelly.*

516. Bateson, W. **The progress of Mendelism.** Nature **104**: 214–216. 1919.—The author presents a review of recent work in genetics ("physiology of breeding"), touching on Morgan's linear arrangement of genes, time of segregation, sex linkage, sex determination, cumulative factors, and species crosses. Segregation is clearly connected with synapsis in animals but not always in plants; somatic segregation and cases where male and female organs of the same plant differ in the factors they carry are cited. The author suspects that plants, as genetic machines, differ fundamentally from animals, an idea suggested by the fact that

"in the animal the rudiments of the gametes are often visibly separated at an early embryonic stage, whereas in the plant they are given off from persistent growing points." Considering the work of Nilsson-Ehle and East on cumulative factors, the author concludes that "many factors can, and on occasion do, break up as the sex-factor almost certainly does. . . ." —*Merle C. Coulter.*

517. Blakeslee, Albert F. **A chemical method of distinguishing genetic types of yellow cones in Rudbeckia.** Zeitschr. Indukt. Abstamm.- u. Vererb. 25: 211–221. *Pl. 9.* 1921.—The author reports on the variation of *Rudbeckia hirta* possessing a yellow disk or cone. Treatment of yellow-coned plants with alkalies revealed 2 types; in one the cones turned blackish and in the other reddish. Each type proved to be a simple Mendelian recessive when crossed with normal purple cone. The 2 yellow types crossed gave purple plants in F_1 and a ratio of 9 purples to 7 yellows in F_2. Alkalies showed that F_2 yellows were again of blackish and reddish-yellow kinds. Chemical treatment indicated in the yellow group what might correspond to the double recessive expected once in every 16 F_2 individuals. No genetical tests were applied to identify this yellow type.—*James P. Kelly.*

518. Blandenier, A. E. **Note sur les principaux cotons égyptiens et leurs hybridations.** [Note on the principal Egyptian cottons and their hybrids.] Proc. Verb. Soc. Vaud. Sci. Nat. 11. 1920.—The author was collaborator of the late Professor Sickenberger, who is quoted to the effect that Egyptian cottons have undergone continual transformation as the result of incessant natural hybridization. The author regards existing Egyptian varieties as complexes of hybrids among 4 species of *Gossypium,—G. arboreum, G. barbadense, G. tomentosum,* and *G. herbaceum,*—and claims that the several interspecific hybrids present in each variety-complex can be distinguished by the color of the "fuzz," or short hairs, on the seed. —*T. H. Kearney.*

519. Blaringhem, L. **Métamorphose des étamines en carpelles dans le genre Papaver.** [Metamophosis of the stamens into carpels in the genus Papaver.] Compt. Rend. Soc. Biol. 83: 1521–1523. 1920.—*Papaver bracteatum* ordinarily shows few variations. Tardy shoots, however, have been observed to give small, abnormal flowers in which there is surprisingly complete metamorphosis of stamens into carpels. The author thinks the change is due to a disturbed equilibrium in water relations, the stem providing more water than can be transpired by these tardy and underdeveloped buds. This metamorphosis is exceptional in *P. bracteatum,* but a similar phenomenon commonly occurs as a heritable mutation in *P. somniferum polycephalum.*—*Merle C. Coulter.*

520. Blaringhem, L. **Note sur la xenie chez le châtaignier.** [Xenia in the chestnut.] Bull. Soc. Bot. France 66: 354–356. 1919.—*Castanea sativa* crossed with *C. dentata* resulted in an enlarged embryo intermediate between the 2 parents. The enlarged embryo ruptured the wall of the ovule.—*A. Gershoy.*

521. C., G. H. **Studies in animal inheritance.** [Rev. of: (1) Castle, W. E. **Studies of heredity in rabbits, rats and mice.** Carnegie Inst. Washington Publ. 288. *56 p., 3 pl.* 1919 (see also Bot. Absts. 6, Entry 723). (2) Onslow, H. **The inheritance of wing colour in Lepidoptera. 1. Abraxas grossulariata var. lutea (Cockerell).** Jour. Genetics 8: 209–259. *Pl. 9–10, 25 fig.* 1919 (see Bot. Absts. 4, Entry 689). (3) Harrison, J. W. Heslop. **Studies in the hybrid Bistoninae. III. The stimulus of heterozygosis.** Jour. Genetics 8: 259–265. *2 fig.* 1919 (see Bot. Absts. 4, Entry 596). (4) Hindle, Edward. **Sex inheritance in Pediculus humanus var. corporis.** Jour. Genetics 8: 267–277. *1 chart.* 1919 (see Bot. Absts. 4, Entry 611).] Nature 106: 297. 1920.

522. Claussen, P. [German rev. of: Blakeslee, A. F. **Sexual reactions between hermaphroditic and dioecious mucors.** Biol. Bull. 29: 87–102. *3 pl.* 1915.] Zeitschr. Bot. 13: 532–533. 1921.

523. CLAUSSEN, P. [German rev. of: BLAKESLEE, A. F. **Sexuality in mucors.** Science 51: 375–382, 403–409. *4 fig.* 1920 (see Bot. Absts. 5, Entry 330).] Zeitschr. Bot. 13: 531–532. 1921.

524. COOK, O. F. **Cotton a community crop.** Jour. Heredity 11: 174–177. 1920.—Deterioration of cotton varieties is due to cross-pollination in the field and mixing of the seed at public gins. It can be avoided only by limiting each community to a single variety grown from pure seed. It is shown that such limitation makes possible standardization of cultural and marketing practices.—*T. H. Kearney.*

525. COOK, O. F., AND ROBERT CARTER COOK. **Biology and government. Further discussion of Alleyne Ireland's articles on democracy and the accepted facts of heredity.** Jour. Heredity 10: 250–258. 1919.—Contrary to Ireland's theory that we become bimodal, or tend to separate into superior and inferior groups, the author believes that the real tendency is to restrict ourselves further and further toward mediocrity and inferiority. Our system uses up and exterminates talent as rapidly as possible. Biological problems should be studied from the standpoint of politics as much as the problems of government should be studied from the standpoint of biology. Even though autocracies are the strongest governments, the most benevolent autocracy cannot remain benevolent because vanity, ambition, and greed are so dominant in human psychology. Great men in history have not been produced by centralized governments. The conspicuously great men of Germany appeared while it was fairly free, not since it was an efficiently organized government. The sense of present-day humanity that popular government is the best is the product of experience recorded by history. Mr. Ireland's theory of government does not appear progressive but archaic. The general problem of government is to develop popular systems of more direct interest to the people, not to restrict interest or responsibility to a special governing class.—*H. H. Laughlin.*

526. COULTER, M. C. **Chlorophyll inheritance.** [Rev. of: (1) WINGE, Ø. **On the non-Mendelian inheritance in variegated plants.** Compt. Rend. Trav. Lab. Carlsberg 14^{2}: 1–20. *4 fig.* 1919 (see Bot. Absts. 3, Entry 307). (2) LINDSTROM, E. W. **Concerning the inheritance of green and yellow pigments in maize seedlings.** Genetics 6: 91–110. 1921 (see Bot. Absts. 9, Entry 1347).] Bot. Gaz. 72: 110–112. 1921.

527. DEARING, CHARLES. **The production of self-fertile Muscadine grapes.** Proc. Amer. Soc. Hort. Sci. 1917: 30–34. 1918.—An account is given of the origin of perfect-flowered and fully functional hermaphrodites in Muscadine grapes from stocks previously composed of individuals either staminate or functional only as females (imperfect hermaphrodites). Three such plants were obtained among many seedlings and from distinct parentage. In the progeny of these and of crosses with the best varieties of cultivated sorts, about 1,000 hermaphrodites were obtained. Some of these produce fruits of a quality equal to that of the best varieties of Muscadine grapes, some exhibit new characters of fruit which combine the best qualities of different sorts, and some are decidedly more productive.—*A. B. Stout.*

528. EMERSON, R. A. **The genetic relations of plant colors in maize.** Cornell Univ. Agric. Exp. Sta. Mem. 39. *156 p., 11 colored pl.* 1921.—Six major color types of maize, purple, sun red, dilute purple, dilute sun red, brown, and green (colorless); and the subtypes, weak purple, weak sun red, green-anthered purple, green-anthered sun red; and 5 genotypes of green, are described and illustrated, and their environmental and genetic relations discussed. Sun red and dilute sun red types are shown to be dependent on light for development, while purple, dilute purple, and brown develop characteristic colors in local darkness. Diversities of temperature and soil moisture are without direct effect on maize color. Infertile soil intensifies development of purple-red series (anthocyanins) but has no effect on brown (flavonol) pigment. Deficiency of nitrogen, and probably also of phosphorus, is responsible for the effect of infertile soils. Accumulation of carbohydrates is associated with strong color development. Genetic behavior of the several color types is interpreted on the basis of 2

allelomorphic pairs and 2 series of multiple allelomorphs. Two of the 4 are also involved in development of aleurone color. One pair of allelomorphs is linked with yellow endosperm and 1 series of allelomorphs with liguleless leaf.—*R. A. Emerson.*

529. Fairchild, David. **Visible records of heredity.** Jour. Heredity 12: 174–176. 1921.—A plea is made for greater use of photography in recording results of genetic researches, with suggestions for more adequately and properly photographing new forms produced in breeding experiments.—*C. B. Hutchison.*

530. Gutherz, S. von. **Geschlecht und Zellstruktur. [Sex and cell structure.]** Naturwissenschaften 8: 878–888. 1920.—The author presents data taken from the work of others on the question of the relation between sex and cell structure. He discusses in some detail digametic sexes in unisexual organisms, also morphological and physiological aspects of sex chromosomes. Conclusions derived from his investigations on the spermatogenesis in the white mouse are as follows: (1) Spermatogenic development proceeds in rhythmic series; (2) an intra-nuclear basic-staining body looked upon as a heterochromosome is manifest between the middle and end of the spermatocyte period; (3) the heterochromosome may be a form of nucleolus; (4) it becomes indistinguishable in the later stages of spermatogenesis; (5) no final conclusion is reached as to whether the heterochromosome is a sex chromosome.—*Helen Bergfried.*

531. Hilson, G. R. **Cambodia cotton (Gossypium hirsutum). Its deterioration and improvement.** Agric. Jour. India 16: 235–243. 1921.—Deterioration in India of this type of cotton, originally introduced from America, is attributed to absence of selection and possible crossing with other varieties. A method for improvement by selection is outlined.—*T. H. Kearney.*

532. Huxley, Julian S. **The inheritance of acquired characters.** I. Sci. Prog. 15: 640–641. 1921.—A letter written to the editor of "Science Progress," in which the author objects to certain statements made by MacBride in his article: "The inheritance of acquired characters" (see Bot. Absts. 9, Entry 252). [See also Bot. Absts. 10, Entry 541.]—*W. H. Taliaferro.*

533. Jennings, H. S. **Life and death, heredity and evolution in unicellular organisms.** *14 × 21 cm., 233 p., 53 fig.* R. G. Badger: Boston, 1920.—The author presents for students of genetics a review of their field as applied to the unicellular organisms, especially the protozoa. The volume comprises the lectures delivered by the author under the Richard B. Westbrook Free Lectureship Foundation at the Wagner Free Institute in Philadelphia. Chapter I forms an introduction to the general subject and is a general survey of the life histories found in the protozoa with especial reference to such questions as potential immortality, reproduction, mating, and rejuvenescence. It is followed in Chapter II by a short summary of some of the observed facts of inheritance in the protozoa. Attention is directed chiefly toward the general method of inheritance of diversities, the non-inheritance of acquired characters, and the general results of the "pure line" work on protozoa. Chapter III gives a brief review of the recent work which has been carried out in the author's laboratory and which indicates that a race descended from a single parent can be separated into hereditably diverse races by selection. After considering the effectiveness of selection the author reviews in Chapter IV the question of experimental modification of hereditary characteristics (inheritance of environmental effects). Chapters V, VI, and VII give a comprehensive exposition of the general subject of sex and the results of mating in the protozoa. These subjects are taken up from a cytological as well as experimental standpoint and are considered in relation to such questions as rejuvenescence, biparental inheritance and production of variations, and their relation to evolution. In the final chapter a comparison is made between the phenomena observed in the study of genetics in the protozoa and in higher organisms; this chapter also contains a résumé of the general subject. Of particular interest is the reiteration of the author's view that there is no essential disagreement between his work on the effectiveness of selection in the protozoa and the study of mutations and modifying factors in *Drosophila* which has been carried out by Professor Morgan and his collaborators.—*W. H. Taliaferro.*

534. Kappert, H. **Untersuchungen über den Merkmalskomplex glatte-runzlige Samenoberfläche bei der Erbse. [Studies on the character-complex smooth-wrinkled surface of peas.]** Zeitschr. Indukt. Abstamm.- u. Vererb. 24: 185–210. *5 fig.* 1920.—The 4 characters evident on crossing smooth and wrinkled peas are: (1) Appearance of the seed, whether smooth or wrinkled; (2) capacity for water absorption, whether high or low; (3) form of the starch grains, whether long or round; and (4) nature of the starch, whether the grains are separate or clumped. —The author takes exception to Darbishire's statement that these characters are inherited independently. On the contrary, all are caused by the same factor.—A statistical study was made of the form of the starch grain in the parental and hybrid generations. For an expression of form a "breadth index" was used which is the breadth of the starch grain expressed as a percentage of the length. The hybrid was intermediate between the 2 parents in respect to this character.—*C. M. Woodworth.*

535. Kottur, G. L. **Cross-fertilization and sterility in cotton II.** Agric. Jour. India 16: 406–409. 1921.—Evidence presented in a former paper (see Bot. Absts. 9, Entry 241) that continuous self-fertilization of strains of *Gossypium herbaceum* and *G. neglectum* did not induce sterility is confirmed by experience with "one or more strains" of Dharwar-American (*G. hirsutum*). The author attributes increased vigor of F_1 to a combination of recognizable parental characters and states that "cottons which are alike in all or most of their characters, however, do not show any improvement by crossing." In a hybrid between *G. herbaceum* and *G. neglectum*, F_1 showed same kinds and degree of sterility as parents, and F_2 and F_3 a greater amount. A type of complete sterility is described accompanied by vegetative peculiarities (abnormal leaf color, etc.) not seen in parents and F_1, but affecting about 7 per cent of F_2 individuals and from 0 to 20.5 per cent in different F_3 progenies.—*T. H. Kearney.*

536. Lenz. [German rev. of: Bucura, C. **Über Hämophilie beim Weibe. (On haemophilia in women.)** Wien u. Leipzig, 1920.] Zeitschr. Indukt. Abstamm.- u. Vererb. 26: 299–300. 1921.

537. Lenz. [German rev. of: Goldschmidt, R. **Einführung in die Vererbungswissenschaft. Zwanzig Vorlesungen für Studierende, Aerzte, Züchter. Dritte, neubearbeitete Auflage. (Introduction to the science of genetics. 20 lessons for students, physicians, breeders.)** *3rd rev. ed., 519 p., 178 fig.* W. Engelmann: Leipzig, 1920.] Biol. Zentralbl. 41: 382–383. 1921.

538. Lenz. [German rev. of: Lundborg, H. **Hereditary transmission of genotypical deaf-mutism.** Hereditas 1: 35–40. 1920 (see Bot. Absts. 6, Entry 1717).] Zeitschr. Indukt. Abstamm.- u. Vererb. 26: 299. 1921.

539. Lenz. [German rev. of: Mohr, Otto L., and Chr. Wriedt. **A new type of hereditary brachyphalangy in man.** Carnegie Inst. Washington Publ. 295. *64 p., 7 pl., 4 fig.* 1919 (see Bot. Absts. 5, Entry 1584).] Zeitschr. Indukt. Abstamm.- u. Vererb. 26: 300. 1921.

540. Little, C. C. **A note on the human sex ratio.** Proc. Nation. Acad. Sci. [U. S. A.] 6: 250–253. *1 fig.* 1920.—The records of the Sloane Maternity Hospital in New York City were studied for sex ratio among progeny of certain types of matings, and an analysis is attempted by contrasting the sex ratios of the offspring of *primipara* with those of subsequent birth. The 5 categories of matings were: European "pure," European "hybrid," United States white, British West Indies colored, and United States colored. The following conclusions may be drawn: (1) Hybrid white matings give a significant excess of males over pure white matings; (2) hybrid colored matings give a significant excess of females over relatively "pure" colored matings; (3) the difference between the sex ratio of the United States born whites and the United States born colored is 9 times its probable error; (4) in "pure" European matings the offspring of *primipara* have a sex ratio of 115.51 ± 1.5, while the offspring from subsequent births have a ratio of 97.33 ± 1.18,—a difference 9.7 times its probable error; (5) in the hybrid matings studied no such difference between the sex ratio of offspring of *primipara* and of subsequent births exists; (6) the sex ratio of the United States white births recorded is not significantly different from that of hybrid European matings.—*H. H. Laughlin.*

541. MacBride, E. W. **The inheritance of acquired characters. II.** Sci. Prog. 15: 642–644. 1921.—In a letter to the editor of Science Progress, the author attempts to answer criticisms by Julian Huxley (see Bot. Absts. 10, Entry 532) on the author's previous paper on this subject (see Bot. Absts. 9, Entry 252), and reiterates some of his former statements.—*W. H. Taliaferro.*

542. P[openoe], P[aul]. **The child, before and after.** [Rev. of: Feldman, W. M. **The principles of ante-natal and post-natal physiology, pure and applied.** *694 p., 6 pl., 129 fig.* Longmans, Green & Co.: London, 1920.] Jour. Heredity 12: 109. 1921.

543. Safford, William E. **Synopsis of the genus Datura.** Jour. Washington Acad. Sci. 11: 173–189. *3 fig.* 1921.—The present systematic synopsis of the genus *Datura* is part of an extensively illustrated paper on the genus to appear in the Year-Book of the Smithsonian Institution. The purple-flowered form (*Datura Tatula*), which has been found to differ from the white-flowered form by a single Mendelian factor, is included in the latter in the species *D. Stramonium*, as also the form with spineless fruits (*D. inermis*), which is recessive to the type with spiny fruits.—*A. F. Blakeslee.*

544. Schroeder. **Entstehung und Vererbung von Missbildungen an der Hand eines Hypodaktyliestammbaumes. (Origin and inheritance of deformities in the case of a hypodactylous pedigree.)** Monatsschr. Geburtshilfe Gynäkol. 48: 210–222. *3 pl., 7 fig.* 1918.—A condition involving reduction in number of digits and other rather extensive malformation of the hands and feet appears in five successive generations of one family. The progenitress of the strain, who is said to have had normal parents, produced three affected and two normal children. Her normal descendants have apparently had only normal children; the affected individuals have 28 normal and 16 affected offspring. The condition is transmitted by both sexes. Examination of the foetal membranes of the youngest child showed no evidence of an amniogenetic origin of the malformation, which the author regards as a primary germinal variation which may, however, be transmitted by other means than the chromosomes (cytoplasmic). The trait is believed to become progressively less marked in successive generations.—*C. H. Danforth.*

545. Terby, Jeanne. **Les "Taraxacum" de graine sont-ils différents des "Taraxacum" de boutures? [Are Taraxacums produced from seed different from those produced from cuttings?]** Bull. Acad. Roy. Belgique Cl. Sci. 1919: 497–502. 1919.—On the basis of his experiments the author reports the following results: Plants produced from seeds taken from different heads of the same plant show no variability. The conditions to which the embryo is subjected in the seed are without importance from the point of view of variability, since plants produced from cuttings are identical with those produced from seeds of the same plant. Neither the medium in which the plant is cultivated, whether clay or sand, nor the time of year in which the seeds are produced has any influence on variability. The author asks whether these results do not demonstrate, at the same time, that variability is brought about only by chromatin reduction.—*H. C. Sampson.*

546. T[homson], J. A. **Lamarckism unashamed.** [Rev. of: Kidd, W. **Initiative in evolution.** *x + 262 p.* H. F. & G. Witherby: London, 1920.] Nature 107: 419–420. 1921.

547. Vries, Hugo de. **Opera e periodicis collata.** [Works collected from periodicals.] *16.5 × 24 cm., 589 p.* Vol. 5. A. Oosthoek: Utrecht, 1920.—The volume contains reprints of the author's book on "Intracellular pangenesis," published originally in 1889, and 14 other articles on heredity and variation, published in scientific journals during the years 1889–1896. The pagination is not that of the original, but is consecutive for the volume, the full citation of the originals being indicated at the beginning of each article.—*Geo. H. Shull.*

548. Vries, Hugo de. **Opera e periodicis collata.** [Works collected from periodicals.] *16.5 × 24 cm., 593 p.* Vol. 6. A. Oosthoek: Utrecht, 1920.—The volume contains reprints

of 48 articles on variation and heredity which appeared in scientific journals during the years 1897–1914 inclusive. All articles are repaged, but complete citations are given.—*Geo. H. Shull.*

549. Woods, Frederick Adams. **Twins prove the importance of chromosomes.** Jour. Heredity 10: 423–425. 1919.—The author states that identical twins alone have the same kind of chromosomes because early in embryonic life there occurs an almost absolutely precise division of the chromosomes so that 2 individuals develop, controlled by similar determiners. The importance of these determiners is proved by the extreme resemblance of identical twins, thus demonstrating also the lack of importance of the environment. In a sense, environment is all-important, for growth depends upon nourishment, oxygen, and warmth; but these are customary and expected. Identical twins show that ordinary differences within the uterus of the mother, home life, school life, and adult life do not modify greatly the control of the chromosomes. On the other hand, non-identical twins are not similar although having the same similarities and differences that are found in the case of identical twins. Great changes in environment may cause considerable modification in individuals, but great changes are not usual. The physical and mental differences observed in one's friends are due to differences traceable to the chromosomes.—*H. H. Laughlin.*

550. Wright, Sewall. **A case of heredity vs. environment.** [Rev. of: Key, Wilhelmine E. **Heredity and social fitness: a study of differential mating in a Pennsylvania family.** Carnegie Inst. Washington Publ. 296. *102 p., 2 diagrams.* 1920 (see Bot. Absts. 9, Entry 239).] Jour. Heredity 12: 116. 1921.

HORTICULTURE

J. H. Gourley, *Editor*

H. E. Knowlton, *Assistant Editor*

(See also in this issue Entries 391, 392, 400, 433, 435, 443, 490, 527, 693, 702, 719, 726, 727, 740, 773, 776, 778, 789, 839, 855)

FRUITS AND GENERAL HORTICULTURE

551. Anonymous. [Rev. of: Copeland, E. B. **The coco-nut.** *2nd ed., xvi + 225 p., 28 illus.* MacMillan & Co.: London, 1921.] Sci. Prog. [London] 16: 160. 1921.

552. Anonymous. [Rev. of: Whymper, R. **Cocoa and chocolate: their chemistry and manufacture.** *Rev. ed., xxi + 368 p., 16 pl., 38 fig.* J. & A. Churchill: London, 1921.] Sci. Prog. [London] 16: 160. 1921.

553. Atkins, W. R. G. **Natural indigo.** Sci. Prog. [London] 16: 56–70. 1921.—A brief general outline is presented of the field covered in the study of natural indigo. More detailed accounts of the work may be found in the Reports of the Sirsiah Indigo Research Station and in the Botanical Institute, Pusa. The best varieties to grow, proper methods of fertilization and cultivation, best known means of obtaining the indigo from the plant, and the demands of the markets of the world have all been subjects for considerable research. Before the World War natural indigo was being rapidly replaced by a synthetic product. The great value of the plant in adding nitrogen to the soil through the agency of the legume bacteria, and the manurial value of the fermented plants from which the indigo has been removed make it possible to produce the indigo quite cheaply. The plant is not subject to diseases known to be produced by micro-organisms; but a wilt disease, thought by some to be due to a deficiency of available phosphates in the soil, occurs.—*J. L. Weimer.*

554. Birmingham, L. E. **Cooperative organization for fruit growers.** Trans. Indiana Hort. Soc. 1919: 45–48. 1920.—A suggestive account is presented of the organization and activities of a fruit growers union in the Sturgeon Bay region of Wisconsin.—*Max W. Gardner.*

555. Brooks, Charles. **Apple scald—its cause and prevention.** Better Fruit 15^6: 24-26; 15^7: 11-12. 1921.—The author presents a popular discussion of apple scald and of experiments conducted to study means of control. [See also Bot. Absts. 2, Entry 1143; 4, Entry 1617.]—*A. E. Murneek.*

556. Burns, W., and L. B. Kulkarni. **Some observations on the roots of fruit trees.** Agric. Jour. India 15: 620-626. *Pl. 35-37, fig, 1-2.* 1920.—Observations on the spread of roots of citrus and guava trees are recorded.—*J. J. Skinner.*

557. Cardinell, H. A. **Some indirect methods in extension horticulture.** Proc. Amer. Soc. Hort. Sci. 16: 166-171. 1919 [1920].—A discussion is presented of the development of horticultural extension work in Missouri, explaining some indirect methods used in promoting the work, such as: Assisting local dealers to select proper pruning tools and spray supplies; maintaining a list of orchards for sale or lease; publishing selling prices of fruit; and assisting merchants in disposing of their fruits.—*H. W. Richey.*

558. Cruess, W. V. **Rain damage insurance.** Monthly Bull. Dept. Agric. California 10: 58-66. 1921.—The installation of evaporators by vineyard owners permits more thorough ripening of the grapes, thereby greatly increasing the yield and quality of the dried product. An air blast progressive tunnel type of evaporator with furnace equipped to burn oil or wood, and with cars and tracks to facilitate handling of the trays, is recommended.—*E. L. Overholser.*

559. [Druce, G. C.] [Rev. of: Farrer, Reginald. **The English rock garden.** *2 vol. lxxiv + 504 p., viii + 524 p.* T. C. & E. C. Jack: London and Edinburgh, 1919. *£ 3. 3s net.*] Bot. Soc. and Exchange Club British Isles Rept. 5: 591-593. 1919 [1920].

560. Durst, C. E. **The development of practical horticulture, and its relation to the farm bureau movement.** Proc. Amer. Soc. Hort. Sci. 16: 155-162. 1919 [1920].

561. Evans, J. A. **Patch-budding large limbs and trunks of pecan trees.** Texas Agric. Exp. Sta. Circ. 20. *7 p.* 1920.—Detailed directions for patch-budding are given.—*L. Pace.*

562. Fagan, F. N. **Orchard soil management.** Trans. Indiana Hort. Soc. 1919: 56-62. 1920.—An account of experimental results in Pennsylvania orchards with reference to commercial fertilizers, mulches, and cover crops is presented. The importance of maintaining the content of organic matter in the soil is emphasized.—*Max W. Gardner.*

563. Farnsworth, W. W. **Opportunities in small fruit growing.** Trans. Indiana Hort. Soc. 1919: 25-31. 1920.—An account is given of a grower's experience with strawberries, raspberries, and currants.—*Max W. Gardner.*

564. Gardner, V. R. **Pruning the apple.** Trans. Indiana Hort. Soc. 1919: 49-55. 1920.—The terms pruning and training are differentiated. Pruning of the bearing tree should consist of "a thinning out of small branches throughout the top of the tree in such a manner that a more abundant supply of light is made available for each and every fruit spur." Heavy pruning the first 3 or 4 years to force rapid growth is advised.—*Max W. Gardner.*

565. Hooper, Cecil H. **Pollination of fruits.** Jour. Ministry Agric. Great Britain 28: 124-133. 1921.

566. Jenks, A. R. **The county horticultural agent.** Proc. Amer. Soc. Hort. Sci. 16: 163-166. 1919 [1920].

567. Keeble, Frederick. **Intensive cultivation.** Rept. British Assoc. Adv. Sci. 1920: 200-214. 1920.—The author discusses the status of horticulture in Great Britain during the World War. The key-note of the discussion is the part which intensive cultivation has played in the past, and which it should play in the future. The great necessity of education for the average intensive cultivator along horticultural lines is urged.—*C. L. Wilson.*

568. LESOURD, F. **Phosphorescence des bois.** [Phosphorescence of wood.] Rev. Hort. 93: 247. 1921.

569. MOOMAW, SAMUEL B., AND CAROLINE B. SHERMAN. **Australia and New Zealand as markets for American fruit.** U. S. Dept. Agric. Dept. Circ. 145. *16 p.* 1921.

570. NISWONGER, H. R. **Renewing old orchards in Kentucky. First year results in a five-year program.** Kentucky Agric. Exp. Sta. Ext. Circ. 90. *14 p.* 1921.—A short description is given of the methods used and the 1st year's results in renovating 7 Kentucky orchards. The cost of renovation per tree was $1.27. The net return per tree was $1.53.—*W. D. Valleau.*

VEGETABLE CULTURE

571. ANONYMOUS. **Peppers.** U. S. Dept. Agric. Dept. Circ. 160. *10 p.* 1921.—A treatment on growing and canning of peppers is presented.—*L. R. Hesler.*

572. BROWN, H. D. **Gardening in France.** Trans. Indiana Hort. Soc. 1919: 39–43. *4 fig.* 1920.—The discussion of the relation of such factors as climate and animal pests to gardening conditions in France is followed by a brief account of the use of manure as a fertilizer and the cultural methods used in growing certain vegetables and fruits.—*Max W. Gardner.*

573. HARTWELL, BURT L., AND S. C. DAMON. **Fertilizer versus manure for continuous vegetable growing.** Rhode Island Agric. Exp. Sta. Bull. 182. *10 p.* 1920.—Ten cords of stable manure were compared annually for 16 years with about the equivalent of 2500 pounds of a 5: 6: 6 fertilizer. After the 1st fewy ears, the crops generally grew better with the manure than with the fertilizer. At the end of the 1st decade there were about 800 pounds more nitrogen in an acre foot of the manure area than of the fertilizer area. It is estimated that 1000 pounds more nitrogen had been added in the manure than in the fertilizer.—*B. L. Hartwell.*

574. HUELSEN, WALTER A. **Selecting and saving tomato seed.** Purdue Univ. Agric. Exp. Sta. Bull. 250. *26 p., fig. 1-12.* 1920.—Records of yield under Indiana conditions of different strains of several tomato varieties are presented. For the benefit of growers detailed instructions concerning the technic of selection work are given. These include a description of the important vine and fruit characteristics. A method of large-scale seed separation and the machinery involved, especially the driers, are described and well illustrated.—*Max W. Gardner.*

575. POTTER, GEORGE F. **Hydrocyanic acid injury to tomatoes.** Proc. Amer. Soc. Hort. Sci. 17: 120–126. 1920 [1921].—The author presents experimental data on fumigation of tomatoes to show that "the lethal dose is not directly related to the time of exposure but is almost exactly inversely proportional to the square root of the time." High relative humidity of the air, high moisture content of the soil, and high temperature all lower the maximum safe dose for fumigation.—*H. A. Jones.*

576. THOMPSON, H. C. **Effects of cultivation on soil moisture and yields of certain vegetables.** Proc. Amer. Soc. Hort. Sci. 17: 155–161. 1920 [1921].—"In 1919 early and late crops of carrots, a late crop of beets, and a late crop of beans showed very little advantage in cultivation over scraping off the weeds. The late onions, a crop of lettuce, and the tomatoes responded to cultivation more than simply to killing the weeds. There is a slight evidence that celery was also benefited by cultivation." Data presented for 1920 "show no benefits from cultivation for carrots and cabbage. In fact the yield of cabbage was greater on the scraped plots than on the cultivated plots. Onions, beets, and celery responded to cultivation, and tomatoes show some benefits from cultivation on both the trained and untrained plots." Moisture determinations of the soil made in 1919 on the onion plots show an increase of 1.25 per cent in the cultivated over the scraped plots. In the carrot plots the moisture content

of the soil was 0.19 per cent less in the cultivated plots when compared with the scraped plots. "From a study of the root systems, it appears that those crops which respond least to cultivation, over scraping to keep down weeds, are the ones having the greatest root growth. Where there was considerable space between the rows, which contained few or no roots, cultivation increased the yield. On the other hand, where the space between the rows was well filled with roots, cultivation did not increase the yield over scraping. In fact with cabbage, which crop had the largest root system, the cultivated plots produced much less than the scraped plots . . . Celery and onions responded to cultivation more than the other crops and these two had the poorest distribution of roots and the most space between the rows without roots."—*H. A. Jones.*

MORPHOLOGY, ANATOMY AND HISTOLOGY OF VASCULAR PLANTS

E. W. SINNOTT, *Editor*

(See also in this issue Entries 411, 463, 519, 520, 642, 650, 732, 763, 770, 816, 828, 841, 848)

577. AGRELIUS, FRANK U. G. **Botanical notes, 1917-1918.** Trans. Kansas Acad. Sci. 29: 85. 1920.—Late-flowering dates are recorded for *Diervilla florida* Sieb. & Zucc., *Viola pedata* L., and *Spiraea trilobata* L. (October 22, 1917). Notations regarding *Taraxacum officinale* Weber and polycotyledony in certain tomato and bean seedlings complete the report.—*F. C. Gates.*

578. CHAUVEAUD, GUSTAVE. **Les monocotyledones et les dicotyleones possedent le même type vasculaire.** [Vascular systems in monocotyledons and dicotyledons of the same type.] Bull. Soc. Bot. France 66: 373-381. 1919.—The difference in vascular structure between the 2 main groups of angiosperms which so impressed the older anatomists,—the closed vascular bundles of the monocotyledons and the open bundles with interfascicular cambium and secondary thickening of the dicotyledons,—is not fundamental, since it proves to be simply the predominance of one or other of the terminal forms of a development of which the preceding phases are identical. The difference in vascular organization, especially as based on cambium activity, can no longer be used even to separate the 2 groups, since many monocotyledons, such as *Allium cepa*, have open vascular bundles, while certain dicotyledons, such as the Ranunculaceae, have vascular bundles of the closed type.—*M. A. Raines.*

579. DENIS, MARCEL. **Les sucoirs du Cassytha filiformis L.** [The haustoria of Cassytha filiformis L.] Bull. Soc. Bot. France 66: 398-403. *6 fig.* 1919.—A study of the morphology and development of the haustoria of this phanerogamic parasite is reported. Two stages are distinguished in development, the adhesive and the perforating. Haustoria may be formed at points of contact of branches of occasional free-living individuals.—*A. Gershoy.*

580. FITCH, C. L. **The Colorado wild potato.** Potato Mag. 3^{12}: 12, 26, 28. *4 fig.* 1921.—*Solanum Jamesii* produces small shoots and tubers and many seeds which alone survive some winters. It grows in and near southwestern Colorado in dry soil at an altitude of 6,000 feet. It has proved useful in greenhouse experiments upon the relation of tuber shape to environment.—*Donald Folsom.*

581. GAGNEPAIN, F. **Intéressante adaptation des grains de Sphaeranthus aux stations humides.** [An interesting adaptation of the seeds of Sphaeranthus to moist habitats.] Bull. Soc. Bot. France 66: 409-412. 1919.—The cells of the persistent corolla become filled with air, forming a bladder-like envelope, of different shape in the various species, which provides for dissemination by wind or water.—*A. Gershoy.*

582. KASHYAP, SHIV RAM. **Some observations on Cycas revoluta and C. circinalis growing in Lahore.** Jour. Indian Bot. 2: 116-122. *3 fig.* 1921.—Potted buds of *Cycas revoluta* formed

at first 2 or 3 small crowns of leaves per year, later only 1 crown. On mature plants in the botanic gardens "usually 1 cluster appears every year, whether of (about 60) foliage leaves or (120–170) sporophylls." No male plants are known near Lahore, yet ripe ovules, without embryos, occur, possibly due to the influence of foreign pollen from *Zamia* or *Cycas circinalis*. There is a repeatedly dichotomized specimen of *C. circinalis* in the gardens; this plant tends to produce sporophylls on 1 side only of the growing point ". . . possibly . . . a tendency to variation in the position of the female cone from terminal to lateral." The dichotomy is considered to be due to equal growth of lateral buds.—*Winfield Dudgeon.*

MORPHOLOGY AND TAXONOMY OF ALGAE

E. N. TRANSEAU, *Editor*
L. H. TIFFANY, *Assistant Editor*

(See also in this issue Entries 627, 651)

583. AYYANGAR, M. O. PARTHASARATHY. **Observations on the Volvocaceae of Madras.** Jour. Indian Bot. 1: 330–336. 1920.—Rainfall is intermittent, with the principal fall during the winter monsoon, October–December. For 1919 the total rainfall was slightly over 50 inches, and the mean temperature ranged from 77.8 to 90.2° F. Volvocaceae are found in various temporary and permanent bodies of water and reach their greatest development during the summer. Of the genera recorded as occurring at Madras, *Chlamydomonas*, *Carteria*, *Gonium*, *Pandorina*, and *Eudorina* are common, while *Pleodorina* and *Volvox* are rare.—*Winfield Dudgeon.*

584. CONRAD, W. **Sur un flagellé nouveau à trichocystes, Reckertia sagittifera.** [On a new flagellate having trichocysts. Reckertia sagittifera.] Bull. Acad. Roy. Belgique Cl. Sci. 1920: 541–553. *4 fig.* 1920.—The author describes a new flagellate collected in August, 1920, in an aquarium at the Botanical Garden of Brussels. Special consideration is given the origin and development of the trichocysts.—*Henri Micheels.*

585. COUPIN, HENRI. **Algae.** Album Gén. des Cryptogames Fasc. 23. *Pl. 214–221.* 1921.—The present fascicle, like the preceding, consists of 2 parts, one devoted to the algae, the other to the fungi. The material is in the form of black and white plates accompanied by an explanatory legend and numerous bibliographic notes. It is planned to cover in 50 fascicles all genera of algae and fungi. The series is edited by the author, 5 rue de la Santé, Paris xiii, France.—The genera of the following families of Rhodophyceae are covered in the present fascicle: Acrostylaceae, Gigartinaceae, and portions of Gelidiaceae and Rhodophyllidaceae.—*J. R. Schramm.*

586. COUPIN, HENRI. **Algae.** Album Gén. des Cryptogames Fasc. 24. *Pl. 222–229.* 1921.—The present fascicle completes the genera of the Rhodophyllidaceae, covers the genera of the Sphaerococcaceae, and begins the treatment of the Rhodymeniaceae. [See also Bot. Absts. 10, Entry 585].—*J. R. Schramm.*

587. COUPIN, HENRI. **Algae.** Album Gén. des Cryptogames Fasc. 25. *Pl. 230–237.* 1921.—The present fascicle completes the treatment of the Rhodymeniaceae and begins the presentation of genera of the Delesseriaceae. [See also Bot. Absts. 10, Entry 585.]—*J. R. Schramm.*

588. COUPIN, HENRI. **Algae.** Album Gén. des Cryptogames Fasc. 26. *Pl. 238–244.* 1921.—The author completes the treatment of the Delesseriaceae, presents the family Bonnemaisoniaceae, and begins the consideration of genera of the Rhodomelaceae. [See also Bot. Absts. 10, Entry 585.]—*J. R. Schramm.*

589. COUPIN, HENRI. **Algae.** Album Gén. des Cryptogames Fasc. 27. *Pl. 245–252.* 1921.—In the present fascicle the presentation of genera of the Rhodomelaceae is continued. [See also Bot. Absts. 10, Entry 585.]—*J. R. Schramm.*

590. COUPIN, HENRI. **Algae.** Album Gén. des Cryptogames Fasc. 28. *Pl. 253–260.* 1921.—In the present fascicle the author presents the remaining genera of Rhodomelaceae and begins the treatment of the Ceramiaceae. [See also Bot. Absts. 10, Entry 585.]—*J. R. Schramm.*

591. HODGETTS, W. J. **Notes on freshwater algae. I–IV.** New Phytol. 19: 254–263. *Fig. 1–2.* 1920.—A new species of *Pyramimonas*, *P. inconstans*, is described from near Birmingham.—Zoogonidia of *Oedogonium cryptoporum* Wittr., with cilia of a length unusual in the Oedogoniaceae, are described and figured, with notes on the mode of progression.—The Hormidium state of *Prasiola crispa* shows under certain conditions a false branching comparable with that of *Tolypothrix*.—The gametes and zygotes of *Chlamydomonas variabilis* Dang. are described and figured.—*I. F. Lewis.*

592. J., J. **Recent English marine biology.** [Rev. of: ALLEN, E. J. **Contribution to the quantitative study of plankton.** Jour. Marine Biol. Assoc. 12: 1–8. 1919 (see Bot. Absts. 4, Entry 1008).] Nature 104: 707. 1920.—Four 10 cc. samples gave a mean of 14.45 organisms per cc. The same sample examined by inoculating flasks (sterilized sea water with culture solutions used by Allen and Nelson for marine diatoms) showed 464 organisms per cc. This result is apparently an under-estimate as some organisms found in centrifuged samples did not grow in the medium. "The result is therefore another and closer approximation to a biological value which is of extraordinary interest."—*O. A. Stevens.*

593. JANET, CHAS. **Sur le Botrydium granulatum.** [Concerning Botrydium granulatum.] *4 p., 1 pl.* Limoges, 1918.—The plants are found in more or less irregular and often branched form or as pyriform vesicles developed from (1) a purely vegetative cell, (2) an asexual planospore, (3) a zygote. In each case the cell develops a simple vesicle consisting of a spherical layer of nucleated chlorophyllous protoplasm covered with a wall and surrounding a cavity filled with a clear fluid containing numerous corpuscles. A narrow aerial tube is developed from the upper part, a rhizoidal tube from the lower, the former developing into the vesicle. There are 3 kinds of vesicles distinguished by the nature of the cell producing them: (1) Those in which all of the cells of the parietal layer of the vesicle develop in situ into small syncytial blasteas which, through the collapse of the vesicle, are dislodged and disseminated by rain and generally germinate at once. (2) Those in which the protoplasmic layer becomes divided into 1 or several layers of naked protoplasts which become planospores by acquiring a single flagellum. These are then discharged when moist by the swelling and rupturing of the vesicle, later lose their flagella, develop into small spherical blasteas, and germinate as above. (3) Those in which, toward the end of summer, 1 cell in the parietal layer develops in situ into a syncytial blastea at the expense of the rest of the layer, which degenerates and disappears, leaving the blastea to fill the mother vesicle. Each nucleus of the blastea becomes a gamete. The pyriform blastea, when the gametes are about ripe, is discharged by the breaking up of the containing vesicle. When conditions are favorable the wall of the blastea is gelatinized and the gametes are discharged and unite to form zygotes. The blastea is homologized with the oogonium and spermagonium of *Fucus* and with the structure producing the gametangia in the vascular cryptogams.—*Winifred Goldring.*

594. MCNAUGHT, JAMES BERNARD. **Algae of Kansas reservoirs.** Trans. Kansas Acad. Sci. 29: 142–177. *Pl. 1–4.* 1920.—The author presents the first report of the survey of the algae of Kansas, with the special object of aiding the sanitary engineer, including 19-page list of species in key-form; 110 species are listed, only 12 of which had been previously reported from Kansas. Under reservoir conditions changes due to differences in the seasons do not appear to occur.—Examples of the successful use of the copper sulphate method of treatment are given. The algae found most active in causing bad tastes, colors, and odors are species

of *Anabaena*, *Conferva*, *Oscillatoria*, *Spirogyra*, *Cladophora*, *Clathrocystis*, *Synedra*, and *Navicula*. To these may sometimes be added animals of polyzoan and protozoan groups. A bibliography of 33 entries is appended.—*F. C. Gates*.

595. MANGENOT, G. **La structure des anthérozoïdes des Fucacées. [The structure of the sperms of the Fucaceae.]** Compt. Rend. Acad. Sci. Paris 172: 1198–1200. 1921.—The author contributes to the discussion between Strasburger and others on the one hand and Guignard and others on the other as to the nature of the sperm, the former holding that it is all nucleus. The author inclines to the view of Guignard, finding that a large part of the tail of the sperm is protoplasmic in nature, containing inert inclusions and pheoplasts, the latter often in great numbers. The pigment spot is found to arise from the pheoplasts by the development of carotin.—*C. H. Farr.*

596. MANGENOT, G. **Sur les "grains de fucosane" des Phéophycées. [On the so-called grains of fucosan of the Phaeophyceae.]** Compt. Rend. Acad. Sci. Paris 172: 126–129. 1921.—It is decided that the grains of fucosan are neither the living organites of Crato nor the special vacuoles of Kylin, but that they are simply vacuolar precipitates such as tannins and such as occur in other groups of plants.—*C. H. Farr.*

597. PAVILLARD, J. **Sur la reproduction du Chaetoceros Eibenii Meunier. [On the reproduction of Chaetoceros Eibenii.]** Compt. Rend. Acad. Sci. Paris 172: 469–471. *Fig. 1–11.* 1921.—*Chaetoceros Eibenii* belongs to the sub-genus *Phaeoceros*. A description and figures are given of the auxospores and the endocysts in this species; these bodies have never before been reported in this form.—*C. H. Farr.*

598. PAVILLARD, J. **Sur le Gymnodinium pseudonoctiluca Pouchet. [On Gymnodinium pseudonoctiluca.]** Compt. Rend. Acad. Sci. Paris 172: 868–870. *Fig. 1–6.* 1921.—This remarkable organism belongs to the Peridineae. No chromoplasts but many small uncolored plastids are found. Food is ingested.—*C. H. Farr.*

599. SHAW, WALTER R. **Campbellosphaera, a new genus of the Volvocaceae.** Philippine Jour. Sci. 15: 493–520. *Pl. 1–2, fig. 1.* 1919.—The somatic protoplasts lack connecting fibers and the gonidia migrate from the outside to the inside of the embryo.—*Albert R. Sweetser.*

600. TIFFANY, L. H. **Algal food of the young gizzard shad.** Ohio Jour. Sci. 21: 113–122. 1921.—One hundred and forty species and varieties of algae were found in an identifiable condition in the digestive tract of the gizzard shad. These are grouped as Myxophyceae, Euglenidae, Peridineae, Bacillariae, Desmidiaceae, Protococcales, and the filamentous algae.—*H. D. Hooker, Jr.*

MORPHOLOGY AND TAXONOMY OF BRYOPHYTES

ALEXANDER W. EVANS, *Editor*

(See also in this issue Entries 477, 478, 483)

601. ALLORGE, A. P. **Sur deux Sphagnum nouveaux pour la flore parisienne: S. laricinum R. Spruce et S. Warnstorfii Russow. [Two species of Sphagnum new to the flora of Paris: S. laricinum R. Spruce and S. Warnstorfii Russow.]** Bull Soc. Bot. France 66: 406–409. 1919.—A critical study of *S. laricinum* and *S. Warnstorfii* is given, their geographical distribution is described, and the character of the moss flora of Paris is discussed.—*A. Gershoy.*

602. BRITTON, ELIZABETH G. **The rediscovery of Physcomitrium pygmaeum James.** Bryologist 24: 26. 1921.—The original description of *Physcomitrium pygmaeum* was drawn from scanty and immature material collected in Utah, but more abundant and better developed specimens have since been found in Nevada by C. F. Baker and in Alberta by A. H. Brinkman. On the basis of these specimens the author gives a more complete description of the species. [See also Bot. Absts. 9, Entry 878.]—*E. B. Chamberlain.*

603. DAVY DE VIRVILLE, AD., ET ROBERT DOUIN. **Sur les modifications de la forme et de la structure des hépatiques maintenues submergées dans l' eau. [Concerning the modifications of form and structure of hepatics brought about by maintaining them under water.]** Compt. Rend. Acad. Sci. Paris 172: 1306–1308. 1921.—*Riccia ciliata, Fegatella conica, Pellia calycina, Calypogeia Trichomanis, Palgiochila asplenioides,* and *Lophocolea bidentata* were studied. They were all found susceptible to adaptation when submersed but showed changes in development, structure, shape, and direction of growth. If they had been found growing wild in their altered condition they would have been classed as distinct varieties and perhaps as new species, although the genera to which they belonged would still have been recognizable.—*C. H. Farr.*

604. DOUIN, R. **Recherches sur les Marchantiées. [Investigations concerning the Marchantieae.]** Rev. Gén. Bot. 33: 34–55, 99–145, 190–213. *Pl. 1–32, 35 fig.* 1921.—The 1st chapter of this extensive work discusses the structure of the thallus, the vegetative point, and the methods of branching in the Marchantieae, with illustrative examples; the 2nd describes the structure and development of the sexual branches, both male and female; the 3rd deals with the nutrition of the fruiting bodies, and the 4th with an interpretation of the structures involved; the 5th proposes a new classification of the group and gives a critical discussion of its affiliations. From his investigations the author concludes that the thallus develops by the activity of a single initial cell and that the methods of branching are varied, certain methods giving a key to the origin of the male and female inflorescences. He finds that the latter are the products of specialized vegetative points, arising above or below the vegetative point of the thallus, and he uses his deductions as the basis of his new classification, employing certain characters not heretofore used.—*J. C. Gilman.*

605. JANSEN, P. **Die Blüten der Laubmoose. Ein Beitrag zur Kenntnis ihrer äusseren und inneren Gestaltung. [The inflorescences of the mosses. A contribution to our knowledge of their external and internal configuration.]** Hedwigia 62: 163–281. *31 fig.* 1921.—The author shows that the detailed study of moss inflorescences and of their component parts has been largely neglected by bryologists, in spite of its importance from a taxonomic standpoint. In a series of introductory sections he defends and defines the term "inflorescence" as applied to mosses and gives a general discussion of the distribution of the sex organs; of the component parts of inflorescences and their respective functions; of the perigonial and perigynial leaves; of the antheridia, archegonia, and paraphyses; of the perichaetial leaves; of the numerical and spatial relationships in inflorescences; and of the protective and adaptive arrangements which they sometimes show. The main body of the work, however, is occupied by detailed descriptions and figures drawn from the inflorescences of 28 species of mosses, representing a wide range of genera arranged according to Limpricht. The descriptions and figures bring out the histological features of the involucral and perichaetial leaves, as well as their form and other characteristics, and likewise give the peculiarities of the sex organs themselves. The genera treated are the following, a single species being described except where otherwise indicated: *Sphagnum, Andreaea* (2), *Archidium, Dicranum* (4), *Campylopus, Fissidens* (2), *Hedwigia, Splachnum, Funaria, Leptobryum, Webera, Mnium* (3), *Philonotis, Polytrichum, Buxbaumia, Diphyscium, Fontinalis, Dichelyma, Pterygophyllum, Climacium,* and *Amblystegium.*—*A. W. Evans.*

606. JENNINGS, O. E. **Hepatics of Iberia (Spain and Portugal).** [Rev. of: CASARES-GIL, A. **Flora Iberica. Briófitas, primera parte. Hepáticas. (Flora of Iberia. Bryophytes, first part. Hepaticae.)** *8vo., 775 p., 4 pl., 399 fig.* Mus. Nacion. Cien. Nat. Madrid, 1919 (see Bot. Absts. 8, Entry 2027).] Bryologist 24: 30–31. 1921.—The reviewer outlines the divisions and scope of the work, lists the new combinations proposed, and indicates changes in the generic classification of many species. He commends the illustrations and figures and suggests that the manual ought to prove useful to students of the Hepaticae in the U. S. A.—*E. B. Chamberlain.*

607. NAVEAU, R. **Belgische Sphagnum Vormen. [Belgian forms of Sphagnum.]** Bull. Cercle Sci. Anvers (Tijdschr. Wetensch. Kring Antwerp.) 12: 39–43. 1920.—The author comments on the polymorphism of the genus *Sphagnum* and discusses 21 varieties, forms, and subforms of various species, which are known at present from Belgium only. Most of these were recognized by Warnstorf in his "Sphagnologia universalis" of 1911.—*A. W. Evans.*

608. NICHOLSON, WILLIAM EDWARD. **New and rare British hepatics.** Jour. Botany 59: 202–204. 1921.—The author gives notes on *Riccia Huebeneriana* Lindenb., *Cephalozia spiniflora* Schiffn., and *Cephaloziella elachista* (Jack) Schiffn. var. *spinigera* (Lindb.) K. M.—*S. H. Burnham.*

609. PEARSON, WM. HY. **Notes on a small collection of hepatics from Oregon.** Bryologist 24: 21. 1921.—This is a list of 10 species with descriptive notes, based on a collection made by C. Potter within the city limits of Portland, Oregon.—*E. B. Chamberlain.*

610. POTTIER, JACQUES. **La parenté des Andreacées et des hépatiques et un cas tératologique qui la confirme. [The relationship of the Andreaeaceae and the hepatics and a teratological case that confirms it.]** Bull. Mus. Hist. Nat. [Paris] 26: 337–344. *8 fig.* 1920.—The species of *Andreaea* and of certain hepatics have been confused in the past because of similarities of aspect and structure. The structures developed on the germination of the spores of *Andreaea* are more reminiscent of the hepatics than of the mosses. The development of the leaf of the Andreaeaceae resembles that of the Jungermanniaceae and not that of the mosses. The pseudopodium, which also occurs in the Sphagnaceae, has its analogue among the hepatics. The greatest point of resemblance between the 2 groups, however, is the opening of the capsule by 4 valves. In the subgenus *Acroschisma* of *Andreaea* these valves separate quite to the summit of the capsule, as is usual in the hepatics. An abnormal leaf of *Andreaea angustata* with 2 lobes is described and compared with the normal leaves of certain hepatics. This resemblance is not only superficial but extends to the anatomical structure. Especially striking is the resemblance between *Andreaea petrophila* and *Herberta adunca.* The various points of similarity between the Andreaeaceae and the hepatics would seem to indicate an indirect relationship.—*E. B. Payson.*

611. THÉRIOT, I. **Considérations sur la flore bryologique de la Nouvelle-Calédonie et diagnoses d'espèces nouvelles. [Remarks on the bryological flora of New Caledonia and diagnoses of new species.]** Rev. Bryologique 47: 69–71. 1920.—In the 1st part of this article, which is to be continued, the author reviews the work which has been done on the mosses of New Caledonia and estimates that the number of species occurring on the island is approximately 500. In the 2nd part he begins the discussion of a collection made by I. Franc, citing *Trematodon paucifolius* C. M. from New Caledonia for the 1st time and proposing *Holomitrium Franci* as a new species.—*A. W. Evans.*

612. THÉRIOT, I. **Une rectification à propos du Stereodon lignicola Mitt. [A correction in regard to Stereodon lignicola Mitt.]** Rev. Bryologique 47: 71–72. 1920.—It is shown that *Stereodon lignicola* of India was based on 2 distinct species. The 1st is an *Isopterygium* and may be known as *I. lignicola* (Mitt.) Jaeger; the 2nd is a *Sematophyllum*, too fragmentary for determination, although probably undescribed.—*A. W. Evans.*

613. WARNSTORF, C. **Über einige Arten aus der Gattung Calypogeia Raddi sensu Nees. [On certain species of Calypogeia.]** Hedwigia 62: 1–11. 1920.—The author calls attention to the confusion which still prevails regarding the specific limitations of *Calypogeia Trichomanis* (L.) Corda and certain other members of the genus, and records a series of observations based largely on the specimens distributed by V. Schiffner in his "Hepaticae europaeae exsiccatae." He reaches the conclusion that *C. Neesiana* (Massal. & Carest.) K. Müll. is not specifically distinct from *C. Trichomanis*, the one passing into the other by insensible intergradations. In his opinion the specimens distributed by Schiffner under the name *C. paludosa* Warnst. do not represent that species but belong instead to *C. trichomanoides* Warnst. The true *C.*

paludosa and also *C. sphagnicola* (Arn. & Perss.) Warnst. he now regards as synonyms of *C. tenuis* (Aust.) Evans. He recognizes the validity of *C. fissa* (L.) Raddi and also of *C. Muelleriana* Schiffn. (as represented by Schiffner's No. 609), referring *C. adscendens* (Nees) Warnst. to the latter species as a synonym. He likewise maintains that the North American *C. Sullivantii* Aust. is amply distinct from *C. arguta* Mont. & Nees.—*A. W. Evans.*

614. WHELDON, J. A. **New British Sphagna.** Jour. Botany 59: 185–188. *5 fig.* 1921.—The author describes new forms of *Sphagnum rubellum* Wils., *S. plumulosum* Röll, and *S. aquatile* Warnst., and also the following new varieties: *S. obesum* Wils. var. *devoniense* Sherrin & Wheldon and *S. hercynicum* Warnst. var. *Binsteadii* Wheldon. The latter variety is figured.—*S. H. Burnham.*

615. WILLIAMS, R. S. **Hyophila subcucullata sp. nov.** Bryologist 24: 22–25. *Pl. 1.* 1921.—This is a description and plate of a proposed new species, nearest to *Hyophila microcarpa* (Schimp.) Broth.; it was collected by Brothers Leon and Hioram in the province of Pinar del Rio, Cuba.—*E. B. Chamberlain.*

MORPHOLOGY AND TAXONOMY OF FUNGI, LICHENS, BACTERIA, AND MYXOMYCETES

H. M. FITZPATRICK, *Editor*

(See also in this issue Entries 585, 638, and those in the section Pathology)

FUNGI

616. BEHRENS, J. **Die Perithecien des Eichenmehltaus in Deutschland.** [The perithecia of oak mildew in Germany.] Zeitschr. Pflanzenkrankh. 31: 108–110. 1921.—Oak mildew has attracted considerable attention in Europe since 1907 and, although the leaves are abundantly covered with conidia, perithecia are rare. Records show that Arnaud and Foëx found perithecia at Cavillargues, France, and were enabled thereby to identify the mildew with the American oak mildew, *Microsphaera quercina* (Schw.) Barr. In 1920 the author discovered a group of perithecia on a single oak leaf near Hildesheim, Germany. Subsequent comparison showed the form found in Germany to be the same as that in France.—*H. T. Güssow.*

617. FYSON, P. F. [Rev. of: SUNDARAMAN, S. **Ustilago Crameri Koern. on Setaria italica Beauv.** Agric. Res. Inst. Pusa Bull. 97. *11 p., 2 pl., map,* 1921.] Jour. Indian Bot. 2: 154. 1921.

618. HÖHNEL, F. VON. **Bemerkungen zu H. Klebahn, Haupt- und Nebenfruchtformen der Ascomyceten 1918.** [Remarks on H. Klebahn, Perfect and imperfect fruits of Ascomycetes 1918.] Hedwigia 62: 38–55. 1920.—The sources and merits of Klebahn's work are considered and a critical consideration from the point of view of recent taxonomic studies of ascomycetes is given. The author states that Klebahn obtained his measurements partly from dry material imbedded in balsam and partly from material soaked in water. Since dry material gives from 25 to 50 per cent smaller measurements than wet tissues, he thinks that Klebahn's results must be taken with due allowance. He gives differences between Klebahn and other authors for measurements of perithecia, asci, ascospores, and conidia, and then passes to a critical discussion of the treatment of *Mycosphaerella*, which he considers at length regarding the relationships between perfect and imperfect forms, and the bearing of the various fruit forms on the disposition of genera and species. The genera *Carlia*, *Epiploca*, *Gnomonia*, *Entomopeziza*, *Fabraea*, *Pseudopeziza*, *Trochila*, and *Gloeosporium* are discussed with respect to their validity and certain of their species. Klebahn's disposition of genera and species is frequently criticized.—*Bruce Fink.*

619. HÖHNEL, F. VON. **Fragmente zur Mykologie.** [Mycological notes.] Sitzungsber. Akad. Wiss. Wien. (Math.-Nat. Kl.) Abt. 1. 129: 137–184. 1921.—The following are described

as new: *Asterina Loranthacearum* Rehm var. *javensis*, *A. subglobulifera*, *Asterinella tjibodensis*, *Limacinia graminella*, *Hypocrea Bambusae*, *Hypocrella lutulenta*, *Didymella Pandani*, *Astrosphaeriella bambusella*, *Massariopsis substriata*, *Anthostomella graminella*, *A. bambusaecola*, *Paranthostomella bambusella*.—*Botryosphaeria inflata* C. and M. and *Physalospora xanthocephala* B. and S. are believed to be based upon immature stages of the same species, and a form collected in Java, showing upon a dothidiaceous stroma yellow, perithecium-like horns which have only unorganized cellular contents, is believed to be a later stage; it is made the type of a new genus, **Creomelanops**, becoming *C. xanthocephala* (B. and S.) v. H.—Segregation of hyaline-spored species of *Corallomyces* Berk. and Curtis into *Corallomycetella* P. Henn. takes no account of diversity of imperfect spore forms on which 5 sections of the genus can be based; all can be distributed between *Nectria* and *Letendraea*.—*Herpotrichia Schiedermayeriana* var. *Caldariorum* P. Henn. is transferred to the Nectriaceae and a new genus, **Xenonectria** erected to receive it. *Chiagaea* Sacc. based on Otth's description of *Nectria Hippocastani* is fallacious, but forms have since been discovered conforming to the description; this name is retained and several forms hitherto regarded as sphaeriaceous are transferred to it, thus: *Ch. rhodomela* (Fr.) v. H. (*Sphaeria rhodomela*, *Melanomina sanguinarium*), and *Ch. Hendersoniae* (Fckl.) v. H. (*Trematosphaeria porphyrostoma*, *Cucurbitaria Hendersoniae*). Brown-spored Nectrias parasitic in perithecia of other forms are segregated in a new genus, **Weesea**, of which *W. Balansiae* (*Calonectria Balansiae*) is the type.—*Hypocrea equorum* Fckl. and *H. merdaria* Fr. are not distinguishable from *Anthostoma*. *Podospora* Cesati and *Bombardia* Fr. are valid genera differing in characters of ascus and stroma. *Delitschia* is rejected and its species variously distributed, the type becoming *Phorcys didyma*. *Sporormia* differs from *Scleropleella* only in the separation of its mature ascospores into their constituent cells; confusion has arisen owing to the fact that the same species may develop on wood or on dung but grows more luxuriantly on the latter. *Pleophragmia* Fckl. is rejected and its 3 species transferred to *Pleospora*. *Rhynchostoma cornigerum* Karst. conforms to the section *Entosordaria* of Saccardo's *Anthostomella*; the sub-genus is elevated to generic rank and species of *Anthostomella* as well as *Paranthostomella unciniicola* and *P. valdiviana* Speg. are transferred to it.—The imperfect form of *Didymella Pandani* is *Septoriopsis Pandani*.—*Pterydiospora Javanica* has violet spores when ripe.—*Cladosphaeria Sambuci-racemosae* Otth is a small-spored form of *Karstenula hirta* (Fr.) v. H.—*Ophiobolus* consists at present of a mixture of dothidiaceous (*Entodesmium*) and sphaeriaceous (*Leptospora*) types; the genus **Leptosporopsis** is erected to receive the dothidiaceous forms with long spores, like *Ophiobolus Rostrupii*. *Paranthostomella eryngiicola* Speg. is distinct from *Anthostomella*, but *Maurinia* Nies. is rejected; *A. rostrispora* (Ger.) Sacc. is transferred to *Heptameria foliicola* (Sacc.) v. H. together with a number of other forms supposed to be Anthostomellas.—*F. Weiss.*

620. Höhnel, F. von. **Fungi Imperfecti. Beiträge zur Kenntnis derselben. [Contributions to a knowledge of Fungi Imperfecti.]** Hedwigia 62: 56–89. 1921. [Continued from Hedwigia 60: 209. 1918.]—Ninety-five species or genera of imperfect fungi have been considered before the present paper, in which Nos. 96–116 are discussed. The genera and species are as follows: *Cryptodiscus placidioides* Desm., *Asteromella* Pass. & Thüm., **Amphiciliiella** *Eriobotryae* Höhn. gen. & sp. nov., *Strasseria* Bres. & Sacc., *Plagiorhabdus* Shear, *Cytospora Buxi* Desm., *Phoma petiolarum* Desm., *Phyllostictina Ericae* Höhn., *Coleophoma Ericae* Höhn., *Stilbum aureolum* Sacc., *Phyllosticta concentrica* Sacc., *Pazschkeella brasiliensis* Sydow, the dwarfed forms of *Septoria Aceris* (Lib.) Berk. & Br., species of *Septoria* on maples, *Hendersonia fructigena Crataegi* Alles., form genera of *Lophodermellina*, *Readeriella mirabilis* Sydow, *Xyloma caricinum* Fries, *Acarosporium* Buk. & Vleug.; *Diaporthe* and *Phomopsis* on European elms, form genera of *Diaporthe*, *Phoma Samarorum* Desm., and certain species of *Phomopsis*.—Pages 74–76 are devoted to forms of *Septoria* on maples in North America.—*Bruce Fink.*

621. Klebahn, H. **Der Pilz der Tomatenstengelkrankheit und seine Schlauchfruchtform. [The fungus of tomato canker and its ascigerous form.]** Zeitschr. Pflanzenkrankh. 31: 1–16. *10 fig.* 1921.—The fungus, generally referred to *Ascochyta*, showed after over-

wintering, besides its usual pycnidia, numbers of perithecia. Pure cultures, made with the ascospores, proved the relationship between the pycnidia and perithecia; infection experiments with ascospores provided additional proof. Apparently the conidial form resembles very closely Hollos' *Diplodina lycopersici*, if it is not actually identical with it. The perithecia may belong to *Mycosphaerella* or *Didymella*. Owing to the presence of paraphyses, Klebahn places the fungus in the genus *Didymella*, though thus far this genus has not included pathogenic species. Provisionally the ascigerous form may be known as *Didymella lycopersici* n. sp. The author concludes his treatise with a review of related Ascomycetes. But, in view of the fact that most of these apparently related fungi have not been successfully studied as to structure and development, a regrouping of them does not, in his opinion, seem possible at present.—*H. T. Güssow.*

622. LAIBACH, F. **Untersuchungen über einige Septoria-Arten und ihre Fähigkeit zur Bildung höherer Fruchtformen. I und II. [Septoria species in relation to higher fruiting forms.]** Zeitschr. Pflanzenkrankh. 30: 201–223. *12 fig.* 1920.—Several species of the genus *Septoria* Fries are chosen as subjects for research concerning the production of ascigerous forms. The relationship of *S. sorbi* to a species of *Mycosphaerella*, discovered on overwintering leaves of *Sorbus aucuparia*, is proved through infection experiments and pure cultures. In determining the *Mycosphaerella* the author finds it necessary to discuss the *Septoria* species occurring on *Sorbus*. He decides that *Septoria sorbi*, *S. hyalospora*, and *S. piricola* are 3 very closely related fungi which possess almost identical ascigerous forms. He prefers to regard them as distinct, and considers the ascigerous form of *S. piricola* Desm. as *Mycosphaerella sentina* (Fuck.) Schroeter on pear leaves, of *Septoria sorbi* Lasch as *Mycosphaerella aucupariae* Lasch on *Sorbus aucuparia*, and of *Septoria hyalospora* (Mont. et Ces.) Sacc. as *Mycosphaerella topographica* (Sacc. et Speg.) Lindau on *Sorbus torminalis*. *Septoria scabiosicola* (DC.) Desm. was also studied but an ascigerous form was not found.—*H. T. Güssow.*

623. PEYRONEL, BENIAMINO. **La forma ascofora dell 'Oidio della quercia a Roma. [The ascigerous stage of the Oidium on oak at Rome.]** Staz. Sper. Agrarie Ital. 54: 5–10. 1921.—The author in November and in December found the perithecia of the Oidium on oak leaves in 2 different localities in Rome. He attributes their development to the joint action of cold weather and low humidity, and to the necessity of better adaptation of the organism to these conditions. After a review of various related species, the conclusion is reached that the name of the organism is *Oidium gemmiparum* (Ferraris) nob. (*Oidium quercinum* var. *gemmiparum* Ferr. in Ann. Mycol. 1909; *O. alphitoides* Griffon et Maublanc in Bull. Soc. Mycol. France, 1910).—*A. Bonazzi.*

624. ROSSI, GINO DE. **I lieviti apiculati nella fermentazione vinaria. [The yeasts of the group apiculatus and their rôle in the fermentation of wine.]** Staz. Sper. Agrarie Ital. 53: 233–297. *Photomicr. 1–3, fig. 1–8.* 1920.—A contribution is presented on the physiology, morphology, and classification of this comprehensive group of organisms. The paper is divided into 5 chapters as follows: (1) Synthetic review of the collective species *Saccharomyces apiculatus*; (2) description of 2 new species of *Pseudosaccharomyces* common on the grapes and in the musts of the region; (3) studies upon the influence of these organisms upon the path of the fermentation caused by *Saccharomyces ellipsoideus*; (4) experiments upon the use of *Pseudosaccharomyces magnus* in wine manufacture; (5) conclusions. An extensive list of the literature bearing on the subject is appended. Fifty-five stock cultures isolated and studied are divided into the 2 following groups, which have the general characteristics indicated: (1) *Pseudosaccharomyces apiculatus*, a bottom yeast; cells single or in groups of two, 3.4–6 $\times$ 1.5–3.2 μ, gram positive, containing glycogen and fat, non-spore forming, gelatin liquefying, limits of growth between 1–3.5 and 31–35.5°C., thermal death point at 44–47°C. The organism ferments glucose and levulose, producing only 3.15–4.55 per cent alcohol, while it fails to ferment maltose, lactose, and saccharose. (2) *Pseudosaccharomyces magnus*, a bottom yeast; cells grouped in chains of 3–4, each cell measuring 4.8–9.6 $\times$ 2.7–4.8 μ. While the organism behaves somewhat similar to *P. apiculatus*, it does not liquefy gelatin and has a maximum growing temperature of 33–35°C. and a thermal death point of 49–50°C., and under the same conditions

as the former organism produces 8.30–9.15 per cent alcohol. Both organisms, when grown together with *Saccharomyces ellipsoideus*, grow more rapidly than the latter at the start, but are overcome when the alcohol content of the fermenting mixture has reached the point of maximum endurance, after which *S. ellipsoideus* continues the fermentation practically alone. Neither organism induces a noticeable variation in the normal course of the fermentation by *S. ellipsoideus* nor do they produce compounds which are deleterious to the taste of the wine.—*A. Bonazzi.*

625. WEISS, H. B. **Diptera and fungi.** Proc. Biol. Soc. Washington [D. C.] 34: 85–88. 1921.—Attention is called to the relationship between certain Dipterous families, chiefly Mycetophilidae and Platypezidae, and the fleshy fungi, particularly the families Agaricaceae and Polyporaceae. Lists of the insects and the fungus hosts upon which they have been found are given.—*J. C. Gilman.*

LICHENS

626. BIORET, G. **Revue des travaux parus sur les lichens de 1910 à 1919. [Review of the published work on lichens from 1910 to 1919.]** Rev. Gén. Bot. 33: 63–76, 146–160, 214–220, 264–272, 328–336, 372–396. 1921.

627. MOREAU, F. ET MME. [MOREAU]. **Les différentes formes de la symbiose lichénique. Chez le Solorina saccata Ach. et le Solorina crocea Ach. [Different kinds of symbiosis among the lichens. The case of Solorina saccata Ach. and S. crocea Ach.]** Rev. Gén. Bot. 33: 81–87. *Pl. 33.* 1921. Three degrees of symbiotic relation are reported between the fungus and alga in the case of *Solorina saccata* and *S. crocea*. In the 1st case, that of the external cephalodia of *S. saccata*, the alga, foreign to the lichen but accidentally brought in contact with it, brings about a defensive action on the part of the lichen. The alga becomes surrounded by the lichen and its progress is thus limited. In the 2nd case, that of the internal cephalodia of *S. saccata*, the alga is accepted within the tissues of the fungus, but not without certain limitations, as is evidenced by the frequent occurrence of dead algae. In the 3rd case, that of the internal cephalodia of *S. crocea*, the alga is received into intimate relations with the lichen and reaches therefore a larger development. The alga in this case may form a secondary gonidial layer below the usual gonidial layer of the lichen. The differences among these types are due to the degree of tolerance which occurs between the 2 organisms.—*J. C. Gilman.*

628. MOXLEY, GEORGE L. **Some vacation lichens.** Bryologist 24: 24–25. 1921.—The author gives a list of 31 species of lichens collected in the Topanga Canyon region, Southern California. Brief notes accompany the list, and there is a running account of the region and the general collection.—*E. B. Chamberlain.*

629. WATSON, W. [Rev. of: SMITH, ANNIE LORRAIN. **A handbook of the British lichens.** *158 p., 90 fig.* British Museum: 1921.] Jour. Botany 59: 180–182. 1921.

630. ZSCHACKE, H. **Die mitteleuropäischen Verrucariaceen. III. [The Verrucariaceae of central Europe III.]** Hedwigia 62: 90–154. 1921.—This 3rd paper treats the genus *Thelidium*. A 5-line diagnosis of the genus is followed by a long discussion of generic characters. Fifty-two species, 21 with immersed and 31 with semi-immersed perithecia, are treated, including keys, diagnoses, citations of exsiccatae and discussions of distribution, habitat and synonymy. *Thelidium circumvallatum*, *T. wettinense*, and *T. austriacum* are described as new. Several subspecies and forms are listed with short diagnoses; some of these are described as new.—*Bruce Fink.*

MYXOMYCETES

631. ELLIOTT, W. T. **Mycetozoa on the Midland Plateau.** Jour. Botany 59: 193–196. 1921.—The author lists 121 species and varieties of slime molds for Warwickshire, Worcestershire, and Staffordshire.—*S. H. Burnham.*

PALEOBOTANY AND EVOLUTIONARY HISTORY

Edward W. Berry, *Editor*

(See also in this issue Entries 460, 755)

632. Anonymous. **The microstructure of coal.** Nature 107: 282. 1921.—The present is an abstract of a paper by A. L. Booth, read at the autumn meeting of the Iron and Steel Institute. Microscopic examination is very useful in determining suitability of different coals. Commercial British coal is divided into 3 classes: (1) "Humic," composed of leaves, stems, and broken down woody tissue; (2) "Spore," in which micro and megaspores predominate; (3) "Cannel." The humic-coals are suited for "steam-raising or town-gas" manufacture, spore-coals for producer gas, and cannel for direct-fired furnaces.—*O. A. Stevens.*

633. Anonymous. [Rev. of: Scott, D. H. **Studies in fossil botany. Vol. I. Pteridophyta.** *3rd ed., xxiii + 434 p., 190 illus.* A. and C. Black: London, 1920 (see Bot. Absts. 8, Entry 2092).] Sci. Prog. [London] 16: 161–162. 1921.

634. Berry, E. W. **A Pseudocycas from British Columbia.** Amer. Jour. Sci. 2: 183–186. *Fig. 1–3.* 1921.—A species of *Pseudocycas* is described from the Upper Cretaceous Dunvegan sandstone of British Columbia.—*E. W. Berry.*

635. Berry, Edward W. **Tertiary fossil plants from the Dominican Republic.** Proc. U. S. Nation. Mus. 59: 117–127. *Pl. 21.* 1921.—New species of *Pisonia, Pocaites, Inga, Pithecolobium, Sophora, Sapindus, Calyptranthes, Bucida, Melastomites, Bumelia,* and *Guettardia* are described from the Tertiary of the Dominican Republic.—*E. W. Berry.*

636. Carpentier, A. [Rev. of: Kidston, R., and W. A. Lang. **On old red sandstone plants showing structure from the Rhynie chert bed, Aberdeenshire. Part III. Asteroxylon Mackiei Kidston and Lang.** Trans. Roy. Soc. Edinburgh 52: 643–680. *Pl. 1–27.* 1920.] Rev. Gén. Bot. 33: 77. 1921.

637. Colani, M. **Étude sur les flores tertiaries de quelques gisements de lignite de l'Indochine et du Yunnan.** [Study of the Tertiary floras of the lignite deposits of Indo-China and Yunnan.] Serv. Géol. Indochine Bull. 8: 11–609. *Pl. 1–30.* 1920.—A detailed and monographic study of the floras associated with the lignites of Yunnan, Tonkin, and Annam is reported. These come from 15 localities, which are fully described. Most of them are of late Tertiary age resting unconformably upon schists or Triassic. Since so few Tertiary floras are known from the tropics the comparative data for exact age determinations are lacking. The oldest flora, that from Na-giao, is believed to be Eocene or Oligocene in age. Most of the floras, although they show slight differences probably due to age, are considered as Mio-Pliocene, and one, that from Tuyên-quang, appears to be Pliocene. All are considered to be pre-Pleistocene. Numerous new species are described and figured; these are critically discussed and carefully compared with related fossil and existing forms. The treatment is conservative throughout, many species being referred to the form genus *Phyllites* with their probable botanic affinity indicated, and several groups of closely related leaves are treated in a broad way, as for example the group of *Quercus Relongtanense* or the group of *Dryophyllum yunnanse.* The Tertiary floras of this region, like that associated with the ape man of Trinil, appear to show a derivation from the eastern Himalayan region, an elevated habitat in the Tertiary or a considerable climatic change in the lowlands. Oriental oaks and the ancestral oaks of the extinct genus *Dryophyllum* are the most prominent elements, and other forms represented include *Libocedrus, Engelhardtia, Myrica, Pisonia, Pseudolmedia, Ficus,* numerous Lauraceae, *Osmanthus, Polyalthia,* etc. The work furnishes a permanent basis for future studies of tropical Tertiary floras and former geographic distribution.—*E. W. Berry.*

638. Colani, M. **Sur quelques Araucarioxylon indochine.** [Upon several Araucarioxylons from Indo-China.] Serv. Géol. Indochine Bull. 6^2: 1–17. *Pl. 1–3.* 1919.—Fragments of

Araucarioxylon from Indo China are described together with traces of fungal and bacterial parasites contained in the silicified wood, of probably Rhaetic age.—*E. W. Berry.*

639. COLANI, M. Sur quelques végétaux Paléozoiques. [Upon several Paleozoic plants.] Serv. Géol. Indochine Bull. 6[1]: 1–21. *Pl. 1–2.* 1919.—*Annularia?*, *Arthropitus?*, *Lepidodendron* C., and various other doubtful objects from Yunnan from a horizon believed to be upper Devonian are recorded.—*E. W. Berry.*

640. COLANI, M. Sur un Dipterocarpoxylon annamense nov. sp. du Tertaire supposé de l'Annam. [On a new species of Dipterocarpoxylon from the supposed Tertiary of Annam.] Serv. Géol. Indochine Bull. 6[3]: 1–8. *Pl. 1–2.* 1919.—A petrified Dipterocarp from the supposed Tertiary of Annam is described.—*E. W. Berry.*

641. DAVIES, D. Ecology of plants from the Westphalian and the lower part of the Staffordian Series of Clydach Vale and Gilfach Goch (East Glamorgan). [Abstracts.] Ann. and Mag. Nat. Hist. 7: 144. 1921.—A generic record has been made of 45,000 plants taken from 10 horizons of these regions. In any 1 horizon the generic proportion remains the same, but when horizons are taken vertically there is often a complete alteration of balance. Equisetales occur on 4 horizons, Filicales on 3, Pteridosperms on 3, Lycopodiales on 2, and Cordaitales on 1. When Lycopodiales are dominant, Filicales and Pteridosperms are rare, and vice versa. It is thought that physical changes caused this alteration of balance of plants. [From author's abstract of a paper read at a meeting of the Geological Society.]—*H. H. Clum.*

642. [DRUCE, G. C.] [Rev. of: SMALL, JAMES. Origin and development of the Compositae (contd.). Reprint from New Phytologist 18: 1–35, 65–91, 129–176, 201–234. 1919 (see Bot. Absts. 3, Entries 1142, 1979; 5, Entry 720; 6, Entry 452).] Bot. Soc. and Exchange Club British Isles Rept. 5: 614. 1919 [1920].

643. EDWARDS, W. N. Note on Parka decipiens. Ann. and Mag. Nat. Hist. 7: 442–444. *Pl. 12, fig. 4–6.* 1921.—Two specimens of *Parka decipiens* Fleming in the British Museum (Natural History) found in the lower Old Red Sandstone of Canterland, Kincardineshire, support the view that *Parka* may have been stalked rather than an entirely independent organism. Both of these specimens are stalked, and 1 shows the stalk attached to a stouter axis. As this one is smaller than any previously found, it is thought that *Parka* may have been attached only in its younger stages.—*H. H. Clum.*

644. EDWARDS, W. N. On a small Bennettitalean flower from the Wealden of Sussex. Ann. and Mag. Nat. Hist. 7: 440–442. *Pl. 12, fig. 1–3.* 1921.—A specimen in the British Museum (Natural History) registered as "Wealden, near Hastings," consists of a whorl of bracts, thought to be sporophylls, radiating from a prominent central region. Little could be discerned of the structure of the central region, but some microspores were obtained. The specimen is thought to belong to the genus *Williamsoniella*, and the name *Williamsoniella valdensis* is proposed.—*H. H. Clum.*

645. E[DWARDS], W. N. [Rev. of: SEWARD, A. C. A text book for students of botany and geology. Vol. IV. *xvi + 543 p., fig. 630–818.* Cambridge, 1919.] New Phytol. 19: 277–278. 1920.

646. F[YSON], P. F. [Rev. of: ARBER, AGNES. Water plants, a study of aquatic angiosperms. *xvi + 436 p., 171 fig.* Cambridge Univ. Press: 1920 (see Bot. Absts. 9, Entry 374).] Jour. Indian Bot. 2: 155–156. 1921.

647. HALLE, T. G. Psilophyton (?) Hedei n. sp., probably a land-plant from the Silurian of Gothland. Svensk Bot. Tidskr. 14: 258–260. *Pl. 1.* 1920.—The author describes what appears to be a species of *Psilophyton* from an outcrop in Gothland of Silurian age and correlated with the Lower Ludlow of Britain.—*E. W. Berry.*

648. KIDSTON, R., AND W. H. LANG. **On the old red sandstone plants showing structure from the Rhynie Chert bed, Aberdeenshire. Parts 4 and 5.** [Abstract.] Proc. Roy. Soc. Edinburgh 41^2: 117–118. 1921.

649. MACBRIDE, E. W. **The method of evolution.** Scientia **28**: 23–33. 1920.

650. MENDIOLA, N. B. **On the evolution of the corn ear.** Philippine Agric. Rev. **13**: 112–114. *Pl. 1–4.* 1920.—The author gives additional data, with illustrations, confirming Montgomery's theory that the ear of corn originated from the central spike of some tassel-like structure similar to the corn tassel.—*E. D. Merrill.*

651. MORELLET, LUCIEN AND JEAN. **Nouvelle contribution à l'étude des Dasycladacées tertiaries. [New contribution to the study of the Tertiary Dasycladaceae.]** Compt. Rend. Sommaire Soc. Géol. France **10**: 135–136. 1921.—Preliminary notice is given of a memoir on these algae which will be published in the Memoirs of the Society.—*E. W. Berry.*

652. PETRONIEVICS, BRANISLAV. **Lois de l'évolution des espèces, des rameaux phylétiques et des groupes.** Rev. Gén. Sci. Pures et Appl. **32**: 140–143. 1921.

653. SCHUCHERT, CHARLES. **The evolution of primitive plants from the geologist's viewpoint.** New Phytol. **19**: 272–275. 1920.—In the course of favorable comment on Church's Thallasiophyta and the Subaerial Transmigration, the author points out that there was never a universal ocean, that the amount of water in the hydrosphere has increased during the geological ages, and that the Archeozoic oceans had far less salts and probably a different salt combination than the ocean of today. [See also Bot. Absts. 7, Entry 2007.]—*I. F. Lewis.*

654. SEWARD, A. C. **The Cretaceous-Tertiary boundary in North America.** [Rev. of: LEE, WILLIS, T., AND F. H. KNOWLTON. **Geology and paleontology of the Raton mesa and other regions in Colorado and New Mexico.** U. S. Geol. Surv. Professional Paper 101.] Nature **107**: 282–283. 1921.—Conclusions are regarded as of great interest from a geological point of view. Both Vermejo and Raton formations are rich in fossil plants; the former is correlated with the Montana flora, the Raton is believed to be Eocene. It is unfortunate that little attempt is made to compare the plants with species other than American. The absence of conifers in Raton is interesting, but it is scarcely safe to assume the group was unrepresented in the contemporary vegetation of the district.—*O. A. Stevens.*

655. SEWARD, A. C. **Plant evolution.** [Rev. of: SCOTT, D. H. **Studies in fossil botany.** *3rd ed.* **Vol. 1. Pteridophyta.** *3rd ed., xxiii + 434 p.* A. and C. Black: London, 1920 (see Bot. Absts. 8, Entry 2092).] Nature **107**: 197–198. 1921.

656. VAULX, R. DE LA, ET P. MARTY. **Adjonctions à la flore fossile de Varennes. [Additions to the fossil flora of Varennes.]** Rev. Gén. Bot. **33**: 238–243. *Pl. 45.* 1921.—Five species are added to the list of plants reported in the fossil flora of Varennes. They are: *Salix cinerea, Ulmus ciliata, Abronia Bronnii, Rubus niacensis* (*R. caesius*), and *Cotoneaster Boulayi*; the last is new to fossil floras in general. Of these, the first 4 exist in the Tertiary flora of the volcano of Cantal, and all but *Abronia Bronnii* are still found as part of the indigenous flora of Mont Dore. *Cotoneaster Boulayi* is Asiatic and *Abronia Bronnii* North American.—*J. C. Gilman.*

PATHOLOGY

G. H. Coons, *Editor*

C. W. Bennett, *Assistant Editor*

(See also in this issue Entries 384, 397, 412, 414, 425, 438, 439, 444, 452, 509, 553, 575, 621, 764, 782, 783, 785, 786, 787, 788, 789, 848)

PLANT DISEASE SURVEY (REPORTS OF DISEASE OCCURRENCE AND SEVERITY)

657. Werth, E. **Phänalogie und Pflanzenschutz.** [Phenology and plant protection.] Zeitschr. Pflanzenkrankh. 31: 81–89. 1921.—This is a discussion of the organization of a plant pathological service based upon the relationship between plant diseases and weather.—*H. T. Güssow.*

THE HOST (RESISTANCE; SUSCEPTIBILITY; MORBID ANATOMY AND PHYSIOLOGY)

658. Chifflot, J. **Communications écrites.** [Written communications.] Bull. Soc. Path. Vég. France 8: 34–35. 1921.—It is reported that seeds of hollyhock taken from plants badly infected with *Puccinia malvacearum* were immersed in copper sulphate solution, 2 grams to 1 l. of water, for ½ hour; plants grown from these seeds were entirely free from the rust. This is given as evidence that the hollyhock may be grown without injury from the disease and also as contradicting the mycoplasm theory.—*C. L. Shear.*

659. Ducomet, Vital. **Sur le Septoria antirrhini Desm.** [Regarding Septoria antirrhini.] Bull. Soc. Path. Vég. France 8: 33. 1921.—This fungus is reported as a weak parasite on snapdragon (muflier), especially on plants in somewhat abnormal condition, as during the past season, which followed a very mild winter and resulted in the plants assuming a somewhat biennial character with weakened shoots and foliage.—*C. L. Shear.*

660. Foëx, Et. **Les relations entre la leptonécrosse et l'enroulement.** [The relations between leptonecrosis and leaf roll.] Bull. Soc. Path. Vég. France 8: 24–28. 1921.—A résumé is presented of Quanjer's observations on the potato diseases in France. A table is given showing the coördination between phloem necrosis and leaf roll as determined by Quanjer from the examination of stems from plants not seen by him. The few doubtful cases of identification are considered due to the disease not having developed sufficiently to show leaf-roll symptoms. In 2 other cases true leaf-roll symptoms were probably not present. In reference to the accumulation of starch in plants not yet showing phloem necrosis, the author concludes that this tends to prove that it is not necessary that the vessels be obstructed in order to stop the transportation of carbohydrates.—*C. L. Shear.*

661. Morettini, Alessandro. **Aumento della resistenza alla carie del frumento Noè mediante selezione.** [Selection as a means of increasing the resistance of wheat (var. Noè) to stinking smut.] Staz. Sper. Agrarie Ital. 53: 399–413. 1920.—In experiments on resistance and susceptibility of wheat to *Tilletia tritici*, the author used the following methods: Mass selection in the first few years of investigation followed by pure line selection in later years. The variety (Noè) used was extremely susceptible. Infection of seeds was accomplished by moistening them with 1 per cent gum-arabic solutions and thorough dusting with spores. The results of the last 3 years of selection were as follows:

Year		Per cent of heads		
		Sound	Infected	Partially infected
1915	Selected plants	71.13	27.21	1.66
	Check plants	50.55	49.25	0.00
	Difference	20.58	22.04	1.66
1916	Selected plants	50.68	37.10	12.78
	Check plants	22.72	76.84	1.44
	Difference	27.96	39.74	11.34
1917	Selected plants	33.61	42.73	23.66
	Check plants	9.90	86.46	3.64
	Difference	23.71	43.73	20.02

It is concluded that systematic selection increases resistance to stinking smut, even in very susceptible varieties, and may prove valuable in practical application.—*A. Bonazzi.*

662. Pardé, M. **Communications.** Bull. Soc. Path. Vég. France 8: 14. 1921.—In a letter to Et. Foëx the writer states that *Quercus cerris* is very resistant to powdery mildew, *Oidium*, which is so serious on most native species.—*C. L. Shear.*

663. Pritchard, Fred J., and W. S. Porte. **Relation of horse nettle (Solanum carolinense) to leafspot of tomato (Septoria lycopersici).** Jour. Agric. Res. 21: 501–505. *Pl. 95–99.* 1921.—Experimental data are presented to establish the identity of a leafspot disease of nettle with the leafspot disease of tomato.—*D. Reddick.*

664. Smith, Erwin F. **Effect of crowngall inoculations on Bryophyllum.** Jour. Agric. Res. 21: 593–597. *Pl. 101–110.* 1921.—The effect of *Bacterium tumefaciens* on *Bryophyllum calycinum* is like that on tobacco, geranium, etc. The paper controverts the report of M. Levine (see Bot. Absts. 4, Entry 1315) that the shoots found in leafy crowngalls originate from the tumor tissue, and that the organism has no stimulating effect on the formation of shoots, but rather an inhibiting effect.—*D. Reddick.*

665. Weis, F., og K. A. Bondorff. **Kemisk-biologisk undersofelse af skovjord under overernaerede graner i lyngby skov. [Investigations relative to the cause of the hypertrophy of Picea.]** Forst. Forsogsv. Danmark 5: 343–352. 1921.—These researches, which are the continuation of previous work, deal with the cause of hypertrophy observed on *Picea excelsa*. Chemical analyses of the soil in which these plants were growing indicate a high nitrogen content in proportion to mineral elements. The author believes that the cause of the hypertrophy will be found to lie in this unbalanced condition of soil elements. It is found that the nitrogen in these soils, which are for the most part very acid, is quickly changed under favorable conditions to the nitric form. This change seems to be due to microörganisms since it does not occur in sterile soil. None of the common nitrifying bacteria have been isolated, but it is possible that in the forest soils, rich in humus and having a high acid content, other organisms may be instrumental in bringing about nitrification. [Abstract through Kohler, Rev. Gén. Bot. 33: 397. 1921.]—*C. W. Bennett.*

666. Weiss, Freeman, and R. B. Harvey. **Catalase, hydrogen-ion concentration and growth of the potato wart disease.** Jour. Agric. Res. 21: 589–592. 1921.—The overgrowths of *Solanum tuberosum* caused by *Chrysophlyctis endobiotica* were compared with healthy tissue. The hydrogen-ion concentration of the overgrowths is represented by P_H6 and of the healthy tissue by $P_H6.49$.—Catalase activity is much greater in the overgrowth tissue, the values being represented by 17.9 cc. of O_2 for diseased tissue and 7.8 cc. for healthy tissue. Catalase

activity is strongly correlated with growth notwithstanding the higher acidity of the proliferation.—Differences in acidity of the varieties of potatoes are not associated with immunity to wart disease.—*D. Reddick.*

THE PATHOGENE (BIOLOGY; INFECTION PHENOMENA; DISPERSAL)

667. MAINS, E. B., and H. S. JACKSON. **Two strains of Puccinia triticina in the United States.** [Abstract.] Phytopathology 11: 40. 1921.

668. MELCHERS, L. E. **Ecologic and physiologic notes on corn smut, Ustilago zeae.** [Abstract.] Phytopathology 11: 32. 1921.

669. REDDY, CHAS. H. **Experiments with Stewart's disease of dent, flint, and sweet corn.** [Abstract.] Phytopathology 11: 31. 1921.

670. THOMPSON, NOEL F. **The effect of certain chemicals especially copper sulfate and sodium chloride on the germination of bunt spores.** [Abstract.] Phytopathology 11: 37–38. 1921.

671. WEBER, G. F. **Studies on corn rust.** [Abstract.] Phytopathology 11: 31. 1921.

672. YOUNG, H. C., AND C. W. BENNETT. **Studies in parasitism in the Fusarium group.** [Abstract.] Phytopathology 11: 56. 1921.

DESCRIPTIVE PLANT PATHOLOGY

673. BETHEL, ELLSWORTH, AND GILBERT B. POSEY. **Investigations to determine the identity of a Cronartium on Ribes in California.** [Abstract.] Phytopathology 11: 46. 1921.

674. BROADBENT, W. H. **Report of the barberry and the black rust of wheat survey in southwest Wales.** Jour. Ministry Agric. Great Britain 28: 117–123. *1 fig.* 1921.—A popular account is given of the occurrence of black stem rust (*Puccinia graminis*) in Wales and the relation of the outbreak to barberry bushes (*Berberis vulgaris*).—*G. H. Coons.*

675. COLIZZA, CORRADO. **Sopra una malattia porco nota del Giaggiolo prodotta da Septoria Iridis Massal. [Studies on a little-known disease of Iris caused by Septoria Iridis Massal.]** Staz. Sper. Agrarie Ital. 53: 494–504. *Pl. 4, fig. 1–2.* 1920.—The author describes a disease of *Iris florentina* and *Iris germanica* which affects the leaves and flower stalk, invading the parenchymatous tissue but not the fibro-vascular bundles. Under special conditions necrosis due to secondary bacterial infection may set in. The origin is described and apparently is identical with *Septoria iridis.* No injury to the epidermis is necessary for infection to take place, the parasite gaining entrance by way of the stomatal apertures. Drainage and fertilization of the soil together with preventive sprays are suggested as control measures.—*A. Bonazzi.*

676. COOK, MEL. T. **Blossom blight of the peach.** [Abstract.] Phytopathology 11: 43. 1921.

677. DICKSON, JAMES G., HELEN JOHANN, AND GRACE WINELAND. **Second progress report on Fusarium blight (scab) of wheat.** [Abstract.] Phytopathology 11: 35. 1921.

678. GARD, MÉDÉRIC. **Sur le dépérissement des noyers dans quelques régions de la France. [The destruction of walnuts in some parts of France.]** Bull. Soc. Path. Vég. France 8: 41–44. 1921.—Two root rots are described, the 1st attributed to *Armillaria mellea* and the 2nd of unknown cause, the latter producing an effect somewhat similar to that of the 1st and sometimes confused with it, but characterized by gummosis and other distinct symptoms.—*C. L. Shear.*

679. Gardner, Max W., and James B. Kendrick. **Bacterial spot of tomato.** [Abstract.] Phytopathology 11: 55. 1921.

680. Gerretsen, F. C. **Die Bakterien der Coli-Aërogenes-Gruppe als Erreger von Pflanzenkrankheiten.** [Bacteria of the Coli-aërogenes group as the cause of plant diseases.] Zeitschr. Pflanzenkrankh. 30: 223–227. 1920.—Investigations of Wakker's disease of hyacinths revealed that, besides *Bacterium hyacinthi*, in some cases another specific bacterium occurred. The latter was grown in pure culture and used in inoculating a number of bulbs of *Hyacinthus orientalis*. After 40–60 days, in nearly all cases, 1 or more bulb scales had become infected. This bacterium was shown to be the cause of a disease in *H. orientalis* and *Galtonia candicans*, when introduced into the tissues through a wound. The bacterium was studied according to the schedule of the Society of American Bacteriologists, receiving the classification number 222.111.301. The author regards the bacterium as of the colon bacillus group which, however, has lost its power of gas production in passing through the plant.—*H. T. Güssow.*

681. Güssow, H. T. **Correspondence écrite.** [A letter to Et. Foëx on rose canker.] Bull. Soc. Path. Vég. France 8: 30. 1921.—The writer states that Sorauer, Wulff, Foëx, and himself are all wrong in attributing the rose canker of Europe and Canada to frost or *Coniothyrium*. He believes after further study that it is due to *Bacterium tumefaciens*.—*C. L. Shear.*

682. Himmelbaur, W. **Heterosporium gracile (Wallroth) Saccardo auf Irisblättern.** [Hetersporium gracile (Wallroth) Saccardo on Iris leaves.] Zeitschr. Landw. Versuchsw. Deutsch Österreich 23: 131–141. *7 fig.* 1920.—A disease of iris leaves due to *Heterosporium gracile* is described. A description of the fungus, its life history, and mode of entrance into the host are given. The fungus is considered as only weakly parasitic, and is able to cause serious injury only on plants so closely placed as to prevent proper air circulation, and then only in wet seasons. Microchemical reactions of the diseased parts and of the fungous mycelium are given. The placing of plants far enough apart to allow proper circulation of air is recommended.—*John W. Roberts.*

683. Janchen, Erwin. **Der Kartoffelschorf.** [Potato scab.] Oesterreich. Zeitschr. Kartoffelbau 1[3]: 11–12; 1[4]: 14. 1921.—Three kinds of potato scab from the standpoint of symptoms are distinguished,—shallow scab, deep scab, and knobby scab; etiologically there are Actinomyces and Spongospora scabs. Following Wollenweber the different manifestations of Actinomyces scab are attributed to different species: Thus *Actinomyces incanescens* Wr. causes deep scab; *A. tricolor* Wr., shallow scab; *A. intermedius* (Krüg.) Wr. and *A. nigrificans* (Krüg.) Wr. produce shallow scab on potatoes and girdle scab of beets; *A. aerugineus* Wr. causes knobby scab of potatoes; *A. xanthostroma* Wr. and *A. albus* (R. D.) Gasp. with its varieties *ochroleucus* (Neuk.) Wr. and *cretaceus* (Krüg.) Wr. produce girdle scab on beets, but may also attack potatoes. Scab of other root vegetables is caused by one or more of the species named.—Typically, knobby scab results from attack of *Spongospora subterranea*; the disease is also known as powdery or spongy scab. *Spongospora* and *Plasmodiophora* are referred to the Chytridiales. The relation of soil type, moisture, and reaction to the development of different kinds of scab is discussed. Where potato fields are generally scab-infested the use of resistant varieties is recommended as the best means of control. Some varieties are both immune to wart and resistant to scab.—*F. Weiss.*

684. Janchen, Erwin. **Die Dürrfleckenkrankheit der Kartoffeln.** [The dry-leaf-spot of potatoes.] Oesterreich. Zeitschr. Kartoffelbau 1[6]: 24. 1921.—Distinctive characteristics of leaf blight of potatoes caused by *Macrosporium solani* and control measures for same are given; this disease is becoming of economic importance throughout central Europe.—*F. Weiss.*

685. Johnson, A. G., and R. W. Leukel. **The nematode disease of cereals.** [Abstract.] Phytopathology 11: 41. 1921.

686. McKinney, H. H. **The so-called take-all disease of wheat.** [Abstract.] Phytopathology 11: 37. 1921.

687. MELHUS, I. E. **Bremia on hothouse lettuce.** [Abstract.] Phytopathology 11: 54. 1921.

688. MIÈGE, EMILE. **Note preliminaire sur les principales maladies cryptogamiques observées au Maroc.** [Preliminary note on the principal fungus diseases of Morocco.] Bull. Soc. Path. Vég. France 8: 37–40. 1921.—A brief list, with notes, is presented of the common parasites of the principal farm crops.—*C. L. Shear.*

689. MILLARD, W. A. **Common scab of potatoes.** Jour. Ministry Agric. Great Britain 28: 49–53. *2 fig.* 1921.—Experiments, details as yet unpublished, show that scab in England, as in America, is caused by *Actinomyces scabies*. Planting diseased "seed" has produced only a very slight increase in scab. Control has been obtained by plowing under green crops.—*C. W. Bennett.*

690. MOLLIARD, M. **La galle de l'Aulax minor Hartig.** [The gall of Aulax minor Hartig.] Rev. Gén. Bot. 33: 273–294. *Pl. 46–53, fig. 1–9.* 1921.—The 2 types of galls caused by *Aulax minor* on *Papaver rhaeas* are described and their method of development traced. The galls differ from those produced on *Papaver dubium* by *Aulax papaveris*.—*J. C. Gilman.*

691. POOLE, R. F. **Recent studies on bacteriosis of celery.** [Abstract.] Phytopathology 11: 55. 1921.

692. RICHARDS, B. L. **A dry rot of sugar-beet caused by Corticium vagum.** [Abstract.] Phytopathology 11: 48. 1921.

693. RIVERA, VINCENZO. **Sopra l' azione del Fomes fulvus (Scop.) Fries sul mandorlo.** [The action of Fomes fulvus (Scop.) Fries upon Amygdalus.] Staz. Sper. Agrarie Ital. 54: 114–118. 1921.—The fungus appears to be a true parasite capable of growing for several years in the host without showing a tendency to form fruiting bodies, but capable instead of forming in the cambium layer a thick, tough mycelial mat. A general, premature ageing and a shortening of the internodes in the new branches are the first signs of the disease. It is only when the tree is in the final stages of alteration that the parasite gives rise to fruiting bodies. This form of the disease, which is apparently transmitted by pruning implements and which the author characterizes as the "biologic" form, is to be distinguished from the "chemico-biologic" form, which is responsible for the death within a short time from planting of large numbers of replacement plantings. The latter form of the disease, characterized by a complete lack of mycelial development either in the roots or branches, should be ascribed to an intoxication by some product arising from the final decomposition of the remains of the old infected tree under the saprophytic action of *Fomes fulvus*. Sterilization of pruning implements is recommended as the only rational measure for combatting the disease that in some regions is very destructive.—*A. Bonazzi.*

694. ROSEN, H. R. **A bacterial root and stalk rot of field corn.** [Abstract.] Phytopathology 11: 32–33. 1921.

695. SALMON, E. S. **Hop-"mould" and its control, I.** Jour. Ministry Agric. Great Britain 28: 150–157. *10 fig.* 1921.—Mildew, *Sphaerotheca humuli*, is reported as destructive to the leaf, "burr," and hop-cone of the hop plant. Dusting with flowers of sulphur, cleaning away trash, and removing infected parts from the vines are discussed as control measures.—*C. W. Bennett.*

696. SPIERENBURG, DINA. **Een onbekende ziekte in de iepen.** [An unknown disease of elm.] Tijdschr. Plantenz. 27: 53–60. *Pl. 3.* 1921.—This disease, which was seen in various parts of Netherland for the 1st time during the year 1920 and which seems to be becoming of very great importance, manifests itself by a more or less rapid wilting and dying of the tops of the trees or of single branches, while the whole tree takes on a sickly appearance as if it were suffering from lack of food and water. The branches and stem in cross section show small dark

spots in the rings adjoining the bark. In some cases they are found in the last 2 or 3 rings and it is supposed that the 1st infections must have taken place as early as 1917. The coloring matter from these spots seems to pass into the other portions of the rings so that all of the rings having dark spots are somewhat darker. The same symptoms are to be seen also in the lower portion of the stem and even in the roots. Cultures from discolored portions of the wood have yielded a number of fungi; the work on etiology is to be continued.—*D. Atanasoff.*

697. STEVENS, F. L. **Helminthosporium and wheat foot-rot.** [Abstract.] Phytopathology 11: 37. 1921.

698. TISDALE, W. H., AND J. MITCHELL JENKINS. **Rice straight head and its control.** [Abstract.] Phytopathology 11: 42–43. 1921.

699. UPHOF, J. C. TH. **Eine neue Krankheit von Cephalanthus occidentalis L.** [A new disease of C. occidentalis L.] Zeitschr. Pflanzenkrankh. 31: 100–108. *1 fig.* 1921.—The author describes a disease of *Cephalanthus occidentalis* from southeastern Missouri, U. S. A., which is believed to be a mosaic disease. Of 24 inoculations with juice from an affected plant 18 proved successful. Leaves, petioles, shoots, and roots may show effects of the attack. It is suspected that the disease is carried in the soil, the "virus" from infected roots being spread through the soil, principally by flooding.—*H. T. Güssow.*

700. VALLEAU, W. D. **Wildfire and angular leaf-spot of tobacco.** Kentucky Agric. Ext. Circ. 89. *16 p., illus.* 1921.—The author reports the severe outbreak of wildfire (*Bacterium tabacum*, and angular leaf-spot (*Bacterium angulatum*) of tobacco in Kentucky in 1920. A description of the diseases is given with the results of inoculation experiments in which it was shown that infection takes place primarily through the under side of the leaf. Preventive measures are discussed. Bagging seed heads is suggested as a means of control through preventing seed-pod infection; selection of seed from apparently disease-free fields is not considered a sure means of securing disease-free seed as numerous seed beds were affected in 1920 though the diseases were not present in 1919 to a noticeable degree.—*W. D. Valleau.*

701. WALKER, J. C. **The occurrence of dodder on onions.** [Abstract.] Phytopathology 11: 53. 1921.

ERADICATION AND CONTROL MEASURES

702. BEACH, F. H. **Results of apple blotch control in southern Ohio.** Trans. Indiana Hort. Soc. 1919: 63–72. *4 fig.* 1920.—The importance and distribution of blotch (*Phyllosticta solitaria*) in Ohio is given. The unsatisfactory control secured by a Bordeaux spray at intervals of 3, 6, and 9 weeks after petal fall in 1918 led to the trial of a 2-, 4-, 6-, and 10-week (after petal fall) program in 3 orchards in 1919. A 3–5–50 Bordeaux was used on the varieties Ben Davis and Smith Cider. Data are presented which show that an excellent control of blotch was obtained. It is concluded that the 2-, 4-, and 6-week schedule is far superior to the 3-, 6-, and 9-week schedule. The importance of the earlier application of the 1st spray is emphasized. In a 4th orchard, the relative importance of the 2- and 4-week applications was demonstrated. An account is given of the method of handling the spray gun in order to secure thorough coating of the fruit, foliage, and twigs. It was found that the upper side of the fruit in the top of a tree was commonly left unprotected. Recommendations for blotch control include, in addition to the spray program, dormant pruning to open up dense portions of the tree and to eliminate dead and cankered wood, and spring application of nitrate of soda fertilizers.—*Max W. Gardner.*

703. BERNATSKY, J. **Perozid sowie Kupfervitriol gegen Oidium.** [Perozid and copper sulphate versus Oidium.] Zeitschr. Pflanzenkrankh. 31: 94–96. 1921.—The author reports excellent results from the use of "perozid" against *Oidium* of pumpkins. He emphasizes that his experiments have no reference to the dreaded *Plasmopara cubensis*, only to *Oidium*. He employed sulphur dust, 1 per cent copper sulphate, and "perozid" (2 per cent) 3 times

during the summer. All 3 substances produced the desired effect, but the 2 liquids were superior to the dust. No difference was noticeable between copper sulphate and "perozid" spray.—*H. T. Güssow.*

704. Blodgett, F. M., and Karl Fernow. **Testing seed potatoes for mosaic and leaf-roll.** [Abstract.] Phytopathology 11: 58–59. 1921.

705. Erwin, A. T. **Control of downy mildew of lettuce.** Proc. Amer. Soc. Hort. Sci. 17: 161–168. 1920 [1921].—Twenty-seven varieties of lettuce representing the looseleaf cos and head types were found to be susceptible to lettuce mildew, *Bremia lactucae.* Attack was found to be most severe in the seedling stage, especially during the "unfolding of the cotyledons and the expanding of the first true leaf. If the plants can be kept free from mildew until they are half grown, the disease is of comparatively little importance." Several species of wild lettuce under observation were readily infected by cultures obtained from cultivated lettuce, and conversely the mildew of the wild lettuce grew readily on the cultivated varieties, showing the necessity of destroying wild lettuce in the vicinity of the greenhouses. Drenching the soil with formaldehyde solution (7 pints of formaldehyde to 100 gallons of water), applied at the rate of 1 gallon per square foot, did not control the disease. Bordeaux mixture of 2:2:50 strength sprayed on the seedlings just before the true leaves appear and a 2nd spraying 1 or 2 days before transplanting will readily control lettuce mildew.—*H. A. Jones.*

706. Fromme, F. D., and S. A. Wingard. **Treatment of tobacco seed and suggested program for control of wildfire and angular-spot.** [Abstract.] Phytopathology 11: 48–49. 1921.

707. Keitt, G. W. **Second progress report on apple scab and its control in Wisconsin.** [Abstract.] Phytopathology 11: 43–44. 1921.

708. Köck, Gustav. **Die wirtschaftliche Bedeutung der Kartoffelkrautfäule und die Möglichkeiten der Bekämpfung dieser Krankheit. [The agricultural importance of potato late blight and the possibility of controlling this disease.]** Oesterreich. Zeitschr. Kartoffelbau 1^5: 20; 1^6: 23. 1921.—A popular description is presented of late blight disease of potatoes, including control measures. A copper chloride-lime, proprietary preparation known as "Bosna-Pasta," is recommended as being equal to 1 per cent Bordeaux and as eliminating the necessity of filtering or adjusting the reaction of the mixture.—*F. Weiss.*

709. Krout, Webster S. **Treatment of celery seed for the control of Septoria blight.** Jour. Agric. Res. 21: 369–372. 1921.—Mycelium and spores of *Septoria apii* on or in the seeds of celery [*Apium graveolens*] are either dead or very low in vitality at the end of 2 years and both are dead at the end of 3 years, whereas the seeds are viable for 4 years or more.—The thermal death point (30 minutes) of the spores in tubes is between 38° and 40°C., that of mycelium in tubes about 45°; and that of seeds, 1 or 2 years old, is between 50° and 55°. Preferred temperature for treatment is 48 or 49°C. for 30 minutes.—*D. Reddick.*

710. Martin, William H. **Inoculated vs. uninoculated sulfur for the control of common scab of potato.** [Abstract.] Phytopathology 11: 58. 1921.

711. Melhus, I. E. **Coöperative potato seed treatment experiments (Committee Report).** [Abstract.] Phytopathology 11: 59–60. 1921.

712. Melhus, I. E., J. C. Gilman, and J. B. Kendrick. **The fungicidal action of formaldehyde.** Iowa Agric. Exp. Sta. Res. Bull. 59, *355–397, fig. 6.* 1920.—The studies reported in this bulletin deal with the toxic action of formaldehyde and other surface disinfectants as manifested in potato seed treatment. The organisms used were *Actinomyces scabies* and *Rhizoctonia solani.* Surface disinfection with formaldehyde for the control of scab was more complete at 20°C. than at lower temperatures. Formaldehyde at 48–50°C. for short periods of time was as toxic as mercuric chloride and formaldehyde of the standard formulae. Cover-

ing, after treatment with hot formaldehyde (50°C.), facilitates disinfection. Increasing the concentration increases the toxicity of this chemical to both scab and scurf. Surface disinfection is seldom complete, which introduces a variable factor into field treatment experiments. The extent of soil infestation is best measured in clean, treated seed. Untreated, clean seed in 1919 carried to the field a sufficient number of *Rhizoctonia* sclerotia to cause 6 per cent infection on the progeny. All of the methods of seed treatment reduced the percentage of infection over that of the checks, showing that seed treatment is worth while from a practical standpoint. It was found that the germination of seed tubers was injured with mercuric chloride 1–500 and formaldehyde 1–120, when the temperature was raised above 55°C. for more than 5 minutes. No injury was induced by formaldehyde 1–120 at 50°C. for 2½ minutes followed by covering for 1 hour. Laboratory methods were devised by means of which the value of a given seed treatment can be predicted without the necessity of field trials. The laboratory methods were confirmed in the field trials. The data obtained suggest that formaldehyde solutions used changed strength only slightly on being exposed at room temperature in an open container for 26 days. Dilute solutions of formaldehyde heated to 50°C. and held at this temperature from 5–60 minutes showed no appreciable change in concentration. The concentration of formaldehyde solutions is somewhat lowered when potatoes are treated at 48–50°C. The loss in concentration was greater when steam was used as a source of heat than when employing a heater. The greater loss is probably due to the condensation of the steam in the solution.—*J. C. Gilman.*

713. Pantanelli, E. **Azione fungicida e fisiologica degli anticrittogamici. [Fungicidal and physiological action of anti-cryptogamic compounds.]** Mem. R. Staz. Pat. Veg. Roma **1920**: 1–54. 1920.—The paper is divided into 2 parts, the 1st dealing with the action of the anti-cryptogamic agents on the fungous parasites, the 2nd with the action upon the host plants. The action of Bordeaux mixture, calcium polysulphides (lime-sulphur), barium polysulphides, soap-silver mixtures, and copper oxychloride ("Caffaro paste") was studied upon *Plasmopara viticola, Oidium leucoconium, Fusarium niveum,* and *Botrytis cinerea.* The various functions of the mixtures were studied by 2 different methods. The toxic action was investigated by spraying the substances on glass slides; after drying these were sprayed with a suspension of conidia in 5 per cent saccharose. The antiseptic action, on the other hand, was studied by replacing the nutritive fluids, in which the spores had germinated, first with water and this in turn with the substance under investigation, the operations being carried out under the microscope. The results of the treatment based upon the viability of the spores were ascertained by staining with non-vital stains (of the aniline blue type), by plasmolysis reactions, and by swelling, by increase in granulation and other visible manifestations, and by germinations in a moist chamber after removal of the fungicidal substance. Sugar, as well as glycerine and mannite, when used as a suspension medium was found to increase the antiseptic properties of the dry films of material studied; this the author attributes to the solvent action. The principal results of the 1st part of the investigation lie in the demonstration of the fact that the salts of heavy metals possess a strong antiseptic power, while when once dried, the polysulphides under these same conditions failed to inhibit germination of the spores. Silver salts are the most active, followed by those of copper. The fungicidal power of the mixtures follows a different order, the polysulphides being sometimes far more effective than the others. As preventive agents copper sprays are efficient for long periods, since the hydroxide of the metal is slowly acted upon by CO_2 and rendered less basic and more soluble. Bordeaux mixture prepared by the commonly accepted formulae is acid although it will turn litmus blue. Soap-silver mixtures are also of value in preventive treatments since the silver carbonate, formed by a reaction similar to the reactions with copper, is distinctly soluble. The oxidation of the polysulphides is enhanced by the alkaline reaction of the mixtures so that under atmospheric conditions the dry crust on the sprayed leaves is made up of the following components: calcium carbonate, elementary sulphur, thiosulphates, sulphides, and sulphates. Even though sulphur may be slowly oxidized to sulphur di- and trioxides these products are not necessarily toxic at the low concentrations resulting. Barium polysulphides are always more effective than the corresponding calcium mixtures.—The 2nd part

of the paper deals with the action of the sprays upon the host plant. After washing the treated leaves of *Vitis* with HCl, to remove adhering substances, they were found to have absorbed detectable quantities of copper, calcium sulphate, and thiosulphate radicles. Copper was found to be immobile in the leaf while the calcium tended to migrate to the petiole. Copper sprays increased the turgidity of the cells while the osmotic pressure and molecular concentration of the cell sap (measured by cryoscopic methods) were not materially changed. Leaves treated with polysulphides or left untreated contained less protein nitrogen and insoluble phosphorus compounds than leaves treated with copper sprays, whereas they contained greater quantities of soluble nitrogenous compounds. All spraying materials favored the condensation of sugars into starch and the accumulation of the latter, but Bordeaux mixture was particularly beneficial. In general a parallelism was observed between induced physiological variations in the host cell and the anti-cryptogamic effect of the spray, to the extent that the more efficient chemicals were those which also produced the greater stimulation of the host.—*A. Bonazzi.*

714. Price, W. A. **Bees and their relation to arsenical sprays at blossoming time.** Purdue Univ. Agric. Exp. Sta. Bull. 247. *15 p., fig. 1–7.* 1920.—Bees were found to work freely on sprayed fruit trees and dead bees were found in abundance. Tests showed that a very small amount of arsenic (less than 0.0000005 gram As_2O_3) is a fatal dose for a bee. Bees caged on a tree sprayed when in full bloom with a spray of the formula 1 gallon lime sulphur + 1 pound lead arsenate to 50 gallons of water showed a mortality of 69 per cent. Bees caged on a tree dusted when in full bloom with 85 per cent flowers of sulphur + 15 per cent lead arsenate showed a mortality of 46 per cent. Chemical analyses of the dead bees showed the presence of arsenic. Bees caged on a check tree showed only 19 per cent mortality and no test for arsenic.—*Max W. Gardner.*

715. Schaffnit, E. **Eiweisserdalkaliverbindungen als Zusatzstoffe für Bekämpfungsmittel zur Erhöhung des Haftvermögens. [Albumen-alkaline-earth combinations added to spray solutions to increase adhesion.]** Zeitschr. Pflanzenkrankh. 31: 19–22. 1921.—The author discusses the rôle of alkaline-earth-metal compounds with certain colloidal substances of the group of albuminoid bodies, such as albumens, globulins, etc. Casein-lime combinations have proved of excellent value in increasing the adhesion of spray substances.—*H. T. Güssow.*

716. Smith, G. M., and G. N. Hoffer. **Three methods of controlling the root, stalk, and ear rots of corn.** [Abstract.] Phytopathology 11: 34. 1921.

717. Tolaas, A. G. **Seed certification makes great progress.** Potato Mag. 3^{12}: 9–11, 25. 1921.—The paper includes a tabular summary of rules and conditions regarding potato seed certification in North America in 1920. Plans for yield tests are described.—*Donald Folsom.*

718. Valleau, W. D. **Selection of disease-free seed and seed treatments as a possible means of control of corn root rot.** [Abstract.] Phytopathology 11: 35. 1921.

719. Weimer, J. L. **Reduction in the strength of the mercuric chlorid solution used for disinfecting sweet potatoes.** Jour. Agric. Res. 21: 575–587. 1921.—A bushel of sweet potatoes (*Ipomoea*) submerged in 135 l. of mercuric chloride, 1 to 1000, for 5 minutes in the manner of common agricultural practice reduces the strength of the solution about 1 per cent. This decrease in strength is attributable to the potatoes themselves, to the dirt and fibrous roots adhering, and to the containers of the potatoes and of the solution.—Washed sweet potatoes and Irish potatoes (*Solanum*) remove substantially the same amount of mercuric chloride from solution.—A solution may be kept near its original strength by adding 11 to 14 gm. of mercuric chloride and water to make up original volume, after treatment of each 10 bushels.—*D. Reddick.*

PHARMACOGNOSY AND PHARMACEUTICAL BOTANY

HEBER W. YOUNGKEN, *Editor*
E. N. GATHERCOAL, *Assistant Editor*

(See also in this issue Entries 383, 388, 434, 503, 543, 553, 752)

720. ANONYMOUS. **Export of Buchu leaves.** Pharm. Jour. 106: 459. 1921.—Exports decreased from 204,271 pounds, the average for 1910–1914 inclusive, to 130,161 pounds, the average for 1915–1919 inclusive. In 1909 the Cape Town average price per pound was 8 pence; in 1919, 5 shillings. In 1920 the best grade reached 11 shillings per pound. The world demand for Buchu leaves and oil is increasing and marked interest is being taken in the cultivation of the plant. Extensive experiments on a commercial scale are being carried on at the National Botanic Gardens in Kirstenbosch.—*E. N. Gathercoal.*

721. ANONYMOUS. **Note.** Nature 106: 321. 1920.—Reference is made to an article by Willmot and Robertson in the Lancet for Oct. 23, regarding an outbreak of Senecio poisoning in South Africa in 1918. This, which is probably the first instance in man, was traced to toxic seeds of *Senecio ilicifolius* and *S. Burchelli* in wheat. Similar diseases have long been known in farm animals, and 2 toxic alkaloids, senecifoline and senecifoldine were isolated by H. E. Watt in 1911 from *S. latifolius*. This raises the question of the possible occurrence of the disease in Europe from *S. jacobaea*, which causes disease in sheep in Nova Scotia. Careful cleaning of wheat before milling probably makes risk negligible.—*O. A. Stevens.*

722. BAUDYŠ, E. **Die Sporen der Getreidebrandpilze sind nicht giftig. [Grain smut spores are not poisonous.]** Zeitschr. Pflanzenkrankh. 31: 24–27. 1921.—The question whether spores of grain smut, including *Tilletia tritici*, are poisonous has often been asked, and as often answered,—but rarely satisfactorily. Chickens experimentally fed for 7 weeks with an amount of smutty grain such as would never be encountered in ordinary practice grew well, gained in weight, and showed no ill effects. Mice and rabbits behaved the same. The author then relates experiments conducted on himself in which he consumed considerable quantities of spores of stinking smut contained in biscuits without injurious influence on his health. The records of poisonous effects of *Ustilago longissima* on Sweet Grass by Eriksson and Sorauer led to the belief that this smut caused injury. Köpke insisted that intoxication corresponded to the ingestion of the fungi. The poisoning, the author explains, is not due to smut spores, but to certain glucosides present in the young plants of Sweet Grass, just as in sorghum and other grasses. The content of glucosides varies with climatic influences and ecologic and local factors.—*H. T. Güssow.*

723. DAVIES, EDWARD C. **The assay of colchicum by the phosphotungstic method.** Pharm. Jour. 106: 480–481. 1921.—The drug is exhausted with alcohol, the alcohol recovered, the colchicine taken up with water, shaken out with chloroform, again dissolved with hot water, and precipitated as phospho-tungstate, from which the colchicine is liberated by alkali and chloroform. The great advantage of the method lies in the purity of the resulting alkaloid.—*E. N. Gathercoal.*

724. HAAS, PAUL. **On the nature and composition of Irish moss mucilage.** Pharm. Jour. 106: 485. 1921.—Commercial *Chondrus crispus* yields to cold water a mucilaginous substance whose properties differ from those of the product obtained by a subsequent extraction with hot water. Emulsions of cod liver oil made with the dialysed cold-water extractive are much less stable than when made with the dialysed hot-water extractive. A cooled 5-per cent solution in hot water of the hot-water extractive forms a stiff jelly melting at 41°C. suitable for solid culture media. The gelatinizing power is not affected by prolonged boiling or autoclave sterilization, but is destroyed by heating in the presence of acid. The cold-water extractive forms only liquid mucilages.—*E. N. Gathercoal.*

725. HOLMES, E. M. **Birch tar.** Pharm. Jour. 106: 508. 1921.—This article should be prepared in England from the bark removed from *Betula alba* poles, the latter so commonly used as hop poles in Kent and Sussex. The difficulty of obtaining from Russia a fine birch tar with fairly uniform constants, and the value of betulin anhydride as an antiseptic with an agreeable odor should render such a native industry feasible; or the industry might be developed in India, where immense forests of *Betula Bhojpattra* are available.—*E. N. Gathercoal.*

726. HOLMES, E. M. **Delphinium Staphisagria.** Pharm. Jour. 106: 265. 1921.—Seeds of *Delphinium Staphisagria*, *Anemone Pulsatilla* and other ranunculaceous plants are not likely to germinate unless well-developed, early-ripened seed are planted soon after they are ripened. The seed furnished by some botanical gardens are smaller than those of *D. Staphisagria* and produce plants of *D. pictum.*—*E. N. Gathercoal.*

727. HOLMES, E. M. **Henbane cultivation.** Pharm. Jour. 106: 248–249. 1921.—The seed should be carefully selected, only the largest and first ripened being retained, and should not be completely dried. The smaller, weaker seed tend to produce annual plants. Before planting the seed should be soaked in water over night and the floating portion removed. Soils rich in magnesia are preferred by the plant, the ash of the latter, it is noted, containing 21 parts of magnesia to 18 of potash, 6 of lime, and 5 of soda.—*E. N. Gathercoal.*

728. McCORD, CAREY P., C. H. KILKER, AND DOROTHY K. MINSTER. **Pyrethrum dermatitis—a record of the occurrence of occupational dermatoses among workers in the Pyrethrum industry.** Jour. Amer. Med. Assoc. 77: 448–449. 1921.—Pyrethrum (Dalmatian or Persian insect powder, or "buhach") is the most commonly used household insecticide at this time. It is an efficacious and, at the same time, inexpensive agent; consequently, an extensive industry has grown up around the manufacture of the powder. The extent of its use in the U. S. A. is indicated by the importation in a single year (1917) of 1,504,000 pounds of the crude material. With the recent introduction of large-scale production methods in the manufacture of the powder has come the realization that the industry is subject to conditions of work that are inimical to the health of exposed workers. This powder is made from the flowers of 3 species of *Chrysanthemum* or *Pyrethrum:* (1) *cinerariaefolium*, (2) *roseum*, and (3) *Marshallii* or *carneum*. The principal sources of these flowers are the Caucasus, Persia, Dalmatia, Japan, Montenegro, and in recent years California. There are 3 grades of flowers which determine the value of the powder as an insecticide: (1) The open flowers, which make the poorest grade of powder; (2) the half-closed flowers, which yield a little better grade; (3) the closed flowers, which make the finest grade. The authors discuss: trade processes, substances responsible for the hazard, clinical characteristics, treatment and preventive measures.—*Wm. B. Day.*

729. MUSZYNSKI, JAN. **A new haemostatic: Polygonum hydropiper.** Pharm. Jour. 106: 269–270. 1921.—*Polygonum hydropiper* has been used by the Russian peasants from remote times for arresting bleeding and in the treatment of metrorrhagia. Since ergot and hydrastis have become so scarce and very expensive in Russia, repeated clinical successes have been had with the fluid extract of smartweed as a haemostatic in all cases of internal haemorrhage (pulmonary, gastric, haemorrhoidal, and uterine), even succeeding where ergot and hydrastis had failed.—*E. N. Gathercoal.*

730. SAMAAN, KARAM. **A contribution to the study of digitalis.** Pharm. Jour. 106: 481–482. 1921.—The relative toxicity and pharmacologic action of various concentrated infusions of digitalis, when perfused into the whole heart of the frog, are presented, with special reference to the solvent used in preparing the concentrated infusions as well as the effect of keeping the preparation. Concentrated infusions prepared by percolation of digitalis with 20 per cent alcohol tend to contain more digitoxin and to be more toxic than the aqueous infusion prepared by the British Pharmacopoeia (1914) method. The concentrated infusions presented, upon keeping for 4 weeks, a brown precipitate, about .07 per cent W/V when dried, which was powerfully toxic indicating the presence of digitoxin.—*E. N. Gathercoal.*

731. Tate, G. **Action of heat and moisture on the activity of Ergot and Extractum Ergotae Liquidum.** Pharm. Jour. 106: 485. 1921.—The activity was estimated on the isolated, virgin guinea-pig uterus suspended in 60 cc. of Locke solution at 37°C. Standardized liquid extract heated to 38°C. in an incubator for 25 days showed a loss in activity, and when so heated to 50°C. for 12 days the activity was decreased to a considerable extent. Dry ergot heated in a similar way showed no change but moist ergot so heated (mold developed) indicated a slight increase in activity. Whole ergot should be well dried and kept in air-tight containers. Liquid extract of ergot should not be stored at a temperature rising at any time above 80°F.—*E. N. Gathercoal.*

732. Wallis, T. E. **The structure of Cocculus indicus.** Pharm. Jour. 106: 306–309. *Fig. 1.* 1921.—A detailed description, accompanied by well-executed drawings and references to the literature, is given of the anatomy of the fruit, which constitutes the commercial article.—*E. N. Gathercoal.*

PHYSIOLOGY

B. M. Duggar, *Editor*

Carroll W. Dodge, *Assistant Editor*

(See also in this issue Entries 393, 399, 445, 448, 453, 458, 460, 519, 575, 624, 627, 666, 670, 713, 790, 791, 793, 856)

PROTOPLASM, MOTILITY

733. Anonymous. [Rev. of: Schaeffer, Asa A. **Amoeboid movement.** *vii + 156 p., 46 illus.* Princeton University Press and Oxford Press, 1920.] Sci. Prog. [London] 16: 163–164. 1921.

DIFFUSION, PHYSICO-CHEMICAL RELATIONS

734. B. [Rev. of: Bechhold, Hans. **Die Kolloide in Biologie und Medizin.** (Colloids in biology and medicine.) *2nd ed.* Th. Steinkopff: Dresden and Leipzig, 1919. *Bound, 25 marks.*] Zeitschr. Phys. Chem. 196: 376–377. 1920.

735. Bancroft, Wilder D. [Rev. of: Clark, W. Mansfield. **The determination of hydrogen ions.** *23 × 16 cm., 317p.* Williams and Wilkins Co.: Baltimore, 1920. *$5.00* (see Bot. Absts. 8, Entry 1448).] Jour. Phys. Chem. 25: 87–88. 1921.

736. Burton, E. F., and E. Bishop. **Coagulation of colloidal solutions by electrolytes: influence of concentration of sol.** Jour. Phys. Chem. 24: 701–715. 1920.—The authors reach the following general conclusions from their experiments with copper, arsenious sulphide, and gum mastic in the sol condition: For univalent ions the concentration of ion necessary to produce coagulation increases with decreasing concentration of the colloid; for divalent ions the coagulating concentration of these ions is almost constant and independent of the concentration of the colloid; for trivalent ions the coagulating concentration of the ion varies almost directly with the concentration of the colloid. There are at least 2 properties of the system, colloidal solution plus electrolyte, which influence the coagulating power of any ion; these 2 tend to counteract each other's influence. One dominates the action of univalent ions, the other that of trivalent ions, while the 2 influences seem to be somewhat equalized for divalent ions. It is suggested that an investigation of the influences of the hitherto ignored, but always present, ion that bears the same charge as the colloid (to an equal or greater degree than the coagulating ion in the case of univalent coagulants, and to a less degree in the case of trivalent coagulants) may greatly advance our knowledge of coagulation.—*H. E. Pulling.*

737. Casale, Luigi. **Applicazione del metodo elettrochimico per la determinazione dell' energia acida nei vini.** [The application of an electrochemical method to the determination of true acidity in wines.] Staz. Sper. Agrarie Ital. 53: 395–398. 1920.—This is in continua-

tion of work previously reported by the author (Staz. Sper. Agrarie Ital. 53: 233–243. 1920) and is a contribution in respect to the principle of the apparatus used in the determinations. [See also Bot. Absts. 10, Entry 739.]—*A. Bonazzi*.

738. CASALE, LUIGI. **Studio fisico chimico sul potere assorbente delle terre e sul modo con cui le piante assorbono i materiali nutritivi dal terreno. [A physico-chemical study of the absorptive power of soils and of the method whereby plants absorb nutritive materials from the soil.]** Staz. Sper. Agrarie Ital. 54: 65–113. 1921.—The soil colloidal particle is considered as if coated by a membrane developed by a process analogous to the one that leads to the formation of $Cu_2Fe(CN)_6$ membranes. The particles bear a positive or negative charge according to whether they have yielded to the surrounding solution their anions or cations. Differences of potential are thus established between the particles and a zone of ionic concentration surrounding them. The coagulating power of an electrolyte upon, and the degree of absorption of its ions by, a negative colloid is directly proportional to its ionic concentration and to the relative velocity of its cations, and it is inversely proportional to the solution tension of these same cations. Since the zone of ionic concentration surrounding a particle contains also negatively charged ions, these will also be entrained and, if capable of forming insoluble precipitates, retained on the surface of the particle. Since the relative velocity of the cations present in the zone of concentration regulates the position each one will hold in the shell surrounding the particle, their order will be in a centrifugal direction K, NH_3, Ca, Mg, and Na, and the last ones to reach this shell will also be the ones most easily yielded to a new solvent or electrolyte solution. Causes which vary the difference in potential at the particle-solution surface will also affect absorption; thus basic silicates and humates, treated with boiling HCl and washed free of the products formed therefrom, lose their absorptive powers because of the few cations capable of being yielded to the solution. Organic and other positively charged colloids act by virtue of the ion they yield, and can therefore act within certain limits as protective agents in the coagulation of negative colloids by electrolytes, beyond which limits they facilitate the phenomenon. They absorb both positively and negatively charged ions, but when treated with salts, the metal of which has a lower solution tension than H, they behave similarly to the negative colloids.—Absorption of soil constituents by plant roots takes place by a process analogous to the above. The ectoplasm yields to the soil solution H ions, and establishes thereby a difference of potential between the plant and the soil particles which, in a process of equalization of the unequal charges thus established, adhere to the root cell and yield to it some cations. A continuity is thus established between the soil and the plant, the more distant particles yielding cations to the nearest ones and these in turn yielding them to the ectoplasm. Thence, equilibrium being continually disturbed by the transfer of these materials to the interior of the cell and by their utilization therein, currents are established which, by a play of osmotic forces, regulates the water intake and the concentration of the zone of ionic concentration surrounding the cell. Absorption is enhanced by the transfer of the water from the soil to the plant. When a plant is grown in a nutrient solution the medium is found to increase in acidity, whereas if the solution is made to contain a colloid the H ions are neutralized by the negative charge of the colloid particles and the plant can endure far greater dilutions of nutrient salts. Besides, the removal by the plant of the cations from the suspended particles, increases the negative charge on these and hence also the degree of dispersion, with the result that the solution in the immediate vicinity of the roots becomes clear while it remains cloudy at greater distances. That this phenomenon is not due to a flocculation of the colloid is shown by the fact that equal quantities of solution taken from the 2 zones yielded the following quantities of dry matter: After 6 and 15 days respectively there were in the clear portion 28 and 48 mg., while in the turbid part there were 8 and 4 mg. The passage of ions from cell to cell leads to a partial utilization, the non-utilized portion being poured, together with water (when the osmotic pressure of the cell contents is lower than that of the bundles), into the vascular bundles. The latter, then, are not specific organs for the transportation of water but only regulating receptacles. Fertilizers act by changing the difference of potential between the plant root and the soil particle.—*A. Bonazzi*.

739. CASALE, LUIGI. **Un metodo per la determinazione dell' energia acida nei vini.** [**An electrochemical method for the determination of true acidity in wines.**] Staz. Sper. Agrarie Ital. 53: 298–308. 1920.—The method is based upon the fact that the affinity of acids for bases is a measure of their "strength," and that a base in presence of 2 acids will combine with them in a ratio proportional to their strength, so that an equilibrium will be reached when each acid is isohydric with its respective salt and also with the other acid present in the system. [See also Bot. Absts. 10, Entry 737.]—*A. Bonazzi.*

740. CAUDA, A., E C. MENSIO. **Concentrazione molecolare dei succhi di vite.** [**Molecular concentration of the sap of Vitis.**] Staz. Sper. Agrarie Ital. 53: 317–331. 1920.—The Ostwald-Luther method was applied in the determination of the conductivity of sap collected from the vines in the field or from the crushed young twigs of several varieties of *Vitis*. It was found that the index of conductivity varies throughout the season and that it increases up to a maximum and then decreases. Conductivity measurements are influenced by the presence, in the sap, of organic substances and especially those of an acid character. As a general rule the conductivity of a sap increases with the increase of mineral substances in solution, and for a constant quantity of mineral substances conductivity increases with the increase of extractive materials. Differences in the conductivity of sap from different branches of the same tree may sometimes be quite large, and again striking differences may be obtained in saps obtained from trees of the same variety but of different ages, from trees under different systems of culture, and from different graftings. The authors state that it is quite probable that conductivity of the sap may be proportional to the production of fruit.—*A. Bonazzi.*

741. D., C. [Rev. of: OSTWALD, WO. **Grundriss der Kolloidchemie. Erste Hälfte. (Outline of colloid chemistry.)** *5th ed.* Th. Steinkopff: Dresden and Leipzig, 1919. *16 marks.*] Zeitschr. Phys. Chem. 96: 379. 1920.

742. D., C. [Rev. of: OSTWALD, WO., UND PAUL WOLSKI. **Kleines Praktikum der Kolloidchemie. (Small manual of colloid chemistry.)** *159 p.* Th. Steinkopff: Dresden and Leipzig, 1920. *Kart. 15 marks.*] Zeitschr. Phys. Chem. 96: 379. 1920.

743. FRAZER, CHAS. G. **The action of methylene blue and certain other dyes on living and dead yeast.** Jour. Phys. Chem. 24: 741–748. 1920.—In an attempt to find a "criterion of death" the "behavior of nine dyes with living yeast and yeast killed by boiling or by the action of phenol" was studied. Of these dyes gentian violet, neutral red, and safranin are too toxic; congo red has too little effect on dead cells; fuchsin, neutral red, and safranin are too faint; while erythrosin, eosin, methyl green, and Kahlbaum's methylene blue 6B extra (Grübler's methylene blue and Merck's methylene blue being more toxic) could be used. Erythrosin is better than eosin while methyl green hinders reproduction in some media without staining.—On the whole, erythrosin and methylene blue seem to be the best. Data secured by using methylene blue with various reagents likely to be used in quantitative toxicological work with yeast are given.—*H. E. Pulling.*

744. FREUNDLICH, H. [Rev. of: PÖSCHL, VIKTOR. **Einführung in die Kolloidchemie. (Introduction to colloid chemistry.)** *5th revised and enlarged ed., 148 p.* Theodor Steinkopff: Dresden and Leipzig, 1919. *7 marks.*] Zeitschr. Phys. Chem. 94: 506. 1920.—The book is regarded as containing too many errors and too much material of only historical interest to be the good introductory text it was designed to be and which is needed.—*H. E. Pulling.*

745. HARRIS, J. ARTHUR, ROSS AIKEN GORTNER, AND JOHN V. LAWRENCE. **The osmotic concentration and electrical conductivity of the tissue fluids of ligneous and herbaceous plants.** Jour. Phys. Chem. 25: 122–146. 1921.—"Studies in the Arizona deserts, in the Jamaican montane rain forest, and in the mesophytic habitats of the north shore of Long Island have shown that the osmotic concentration, as measured by the cryoscopic method, is far higher in the leaf tissue fluids of ligneous than of herbaceous species. Because of the wide range, geographic and ecological, over which the data leading to this conclusion were obtained the

authors regard it as a statement of a general biological law. A large series of determinations in the various non-halophytic habitats of the north shore of Long Island" indicate "that while the concentration of ionized electrolytes is lower in ligneous than in herbaceous forms, the reverse is true for total solutes." This conclusion, it is stated, cannot be adjudged general unless confirmed by investigations now in progress.—*H. E. Pulling.*

746. HILL, A. V. **The application of physical methods to physiology.** Sci. Prog. [London] 16: 79–89. 1921.—A plea is made for the adoption of physical methods of investigating the physical manifestations of life. The progress made in the past few years in the physical and chemical sciences is discussed, and it is pointed out how this has been accompanied by additions to our knowledge of the physiology of living organisms.—*J. L. Weimer.*

747. MACDOUGAL, D. T. **The action of bases and salts on biocolloids and cell masses.** Proc. Amer. Phil. Soc. 60: 15–30. 1921.—The strong metalic bases used as hydroxides or as chlorides in concentrations of 0.01 M restrict the hydration of agar according to their relative positions in the electromotive series. The series runs Ca, K, Na, the greatest retardation being effected by calcium. Reversed effects on the hydration of agar were shown by the hydroxides at 0.001 M, and also by the chlorides of calcium, magnesium, potassium, and sodium at 0.001 M. Purified agar shows more swelling in HCl at P_H 4.2 than in water, and shows exaggerated swellings in a series of acid, salt, and hydroxide solutions of P_H 4.2–11. The maximum swelling of a gelatin-agar (3 parts gelatin and 2 parts agar) plate was found at 0.01 M for HCl, at 0.001 M for KCl, and at 0.0001 M for $CaCl_2$. Different ecological types of roots of maize show different hydration reactions to the solutions used. Roots of strawberry and of orange seedlings show differing hydration reactions when grown in saline soils, in sand, or in acid solutions. Effects as of balanced solutions are defined in the relation of certain salts to the hydration of agar, and some suggestions of similar action are noted in the biocolloids employed.—*Wanda Weniger.*

748. SCHADE, H. **Die Kolloide als Träger der Lebenserscheinungen. [Colloids as carriers of life.]** Naturwissenschaften 9: 89–92. 1921.

749. SPRECHER, A. **Recherches cryoscopiques sur des sucs végétaux. [Cryoscopic investigations of plant juices.]** Rev. Gén. Bot. 33: 11–33. *Pl. 35.* 1921.—The juices of variegated leaves, both yellow and dark red, showed less osmotic pressure than green varieties. Variegated nasturtium showed a large proportion of salts in the sap. Those with dark red foliage possessed the largest amount of dry residue in relation to the osmotic pressure, and the yellow and variegated foliage the least. The osmotic pressure of *Tropaeolum* varied during the day, being lowest in the morning and highest in the afternoon. Removal of the flower buds increased the amount of dry residue as well as the osmotic pressure, but this increase was less than in plants which had bloomed. The osmotic pressure was greatest in the sap of the leaf blades of *Tropaeolum*, less in the branches, and least in the petioles. In *Helianthus* the petioles showed the highest osmotic pressure, and then, in order, the leaf blade, the branches, the pith, and the petals. In the case of the brown variety of *Coleus Vershaffelti* and a yellow variety the difference in osmotic pressure was slight. The osmotic pressure of plants is more rapidly changed by the changes in the relative humidity of the environment than by temperature or light. Species with leaves characterized by large cells exhibit osmotic pressures equal to that of species with small cells.—*J. C. Gilman.*

750. WALLER, A. D., MRS. A. D. WALLER, F. O'B. ELLISON, AND T. B. FARMER. **Electromotive phenomena in plants.** Rept. British Assoc. Adv. Sci. 1920: 266. *Pl. 1.* 1920.—The following conclusions are drawn from experiments carried out upon *Iris germanica*: "I. The basal zone of the *Iris* leaf, in which alone active growth is in progress, is electrically active (zincative) in relation to parts where active growth has ceased. II. The zone of active growth is aroused to greater physiological activity (that is, is more zincable) than are parts in which growth is not proceeding."—*C. L. Wilson.*

WATER RELATIONS

751. MILLER, EDWIN C. **Water relations of corn and the sorghums.** Trans. Kansas Acad. Sci. 29: 138–141. 1920.—Sorghum, having only about ½ the leaf surface of corn and a root system approximately twice as great, is able to absorb water from the soil as fast as evaporation from the leaves necessitates replacement. It therefore has an advantage over corn under climatic conditions conducive to great water loss. "The sorghums can produce more dry matter for each unit of leaf area under severe climatic conditions than the corn plant."—*F. C. Gates.*

MINERAL NUTRIENTS

752. BRUNSWICK, HERMANN. **Über das Vorkommen von Gipskrystallen bei den Tamaricaceae. [The occurrence of crystalline calcium sulphate in Tamaricaceae.]** Sitzungsber. Akad. Wiss. Wien (Math.-Nat. Kl.) Abt. I, 129: 115–135. *1 pl., 1 fig.* 1921.—Crystals occurring in epidermal cells of species of *Tamarix* were found to be water soluble, hence not calcium oxalate as previously supposed. Their identity as calcium sulphate, $CaSO_4.2H_2O$, was established by microchemical and gross analysis and by their crystallographic properties. Similar crystals occur in the following genera of Tamaricaceae: *Reaumuria*, *Myricaria*, and *Hololachne*. They are not found in *Fouquieria*, which upon other grounds as well may be segregated in a separate family. The crystals occur most commonly in green and growing tissues, such as leaf mesophyll and veins, vascular bundles and sclerenchymatous elements in the stem, and the various flower parts. Their origin is related to the xerophytic habitat of these plants. The soil water with which the roots are in contact is rich in calcium and magnesium compounds. The excess of sulphate is deposited in the epidermal cells, owing to its slight solubility, while chlorides and carbonates are excreted and accordingly deposited as a crust on the outer surface. In cultivation these plants continue to show crystalline deposits in the epidermal cells, but the external crust is absent; this is attributed to selective absorption of SO_4 as an essential ion.—*F. Weiss.*

753. KOHLER, D. [Rev. of: WEIS, F. **Vandkulturforsog i forskellige naeringsoplosninger, specielt til belysning af manganets og brin-tion-koncentrationens betydning. (Culture experiments with different nutrient solutions, particularly the importance of manganese and the hydrogen ion concentration.)** Meddedel. Plantefysiol. Lab. København 239–280. 1919.] Rev. Gén. Bot. 33: 221–222. 1921.

754. MICHEELS, H. **Note au sujet de l'action des sels de sodium et de potassium sur la germination. [The action of salts of sodium and potassium upon germination.]** Rec. Inst. Bot. Léo Errera (Bruxelles) 10: 161–167. 1921.—Very dilute solutions (1/100 and 1/1000 M.) of KCl, KNO_3, NaCl, and $NaNO_3$ differ very little in electrolytic dissociation, so that in this study a favorable comparison may be made of these salts. In reference to toxicity, and when no current is passed through, it is found that $Cl > No_3$ and $Na > K$. A favorable influence in respect to length of leaves and weight of plantlets produced is exerted by NO_3, likewise this ion induces an elongation of the root hairs not observed with Cl. Although more toxic than K, Na augments the length of roots more than the former. Equivalent results are obtained when the solutions are electrolyzed. The action of the anions occurs in the cathodized solutions, and that of the cathions in the anodized. It is to special physiological properties of the ions, not measurable as chemical properties, that it is necessary to attribute the differences observed.—*Henri Micheels.*

PHOTOSYNTHESIS

755. MOORE, BENJAMIN. **Light as the source of life.** Scientia 28: 361–371. 1920.—Inorganic colloids activated by radiant energy are to be regarded as a stage in the evolution of the microorganism.—*William W. Diehl.*

756. REGNIER, M. [Rev. of: HENRICI, M[ARGUERITE]. **De la teneur en chlorophylle et de l'assimilation du carbon des plantes des Alpes et des plaines. (The chlorophyll content and the assimilation of carbon in plants in the Alps and on the plains.)** Verhandl. Natur. Ges. Basel 30: 43–136. 1919 (1920).] Rev. Gén. Bot. 33: 222–224. 1921.

METABOLISM (GENERAL)

757. BANCROFT, WILDER D. [Rev. of: HARVEY, E. NEWTON. **The nature of animal light.** *x + 182 p.* J. B. Lippincott Co.: Philadelphia, 1920. *$2.50.*] Jour. Phys. Chem. 25: 82–87. 1921.

758. DEZANI, S. **Ricerche sulla diffusione dell' acido solfocianico nei vegetali. Nota II. [The distribution of thiocyanic acid in plants. Second contribution.]** Staz. Sper. Agrarie Ital. 53: 438–450. 1920.—The present contribution is a continuation of an earlier paper (Biochimica e Terapia Sperimentale Fasc. III. 1919). The work of Werenskiold, Pollacci, and of Kooper is here severely criticized on the ground that the methods used by these authors for the detection of SCNH (precipitation of Hg from Hg_2Cl_2 and the green coloration in presence of $CuSO_4$) are not reliable when used upon plant extracts which have not been previously purified.—In a study of *Allium cepa* L., *Castanea vesca* Gaertn., *Phaseolus vulgaris* L., and *Pisum sativum* L., Dezani could obtain the same results as were obtained by the above mentioned investigators only when the tests were made upon the pressed juices and extracts, but he failed to obtain positive results when these plant materials were made alkaline, evaporated to small volume, acidified, extracted with ether, the ether extract thus obtained washed with weak ammonia, and the washings in turn evaporated to small volume and tested for SCNH. In the present investigation the method of extraction was as follows: The fresh material, after crushing, was immediately dropped into boiling water and allowed to stand for 24 hours, after which period the extracts were removed by pressure. The results, given in tabular form, show that, of all the families examined, only members of the Cruciferae appear to contain SCNH, although by no means all the members of this family contain this compound. The author concludes that SCNH is a normal product of metabolism and not one resulting from the breakdown of glucosides of the sinigrin type, nor yet one formed by the post-mortem decomposition of esters of isothiocyanic acid.—*A. Bonazzi.*

759. HARDEN, A. [Rev. of: EULER, H., UND P. LINDNER. **Chemie der Hefe und der alkoholischen Gärung. (Chemistry of yeast and of alcoholic fermentation.)** *x + 350 p., 2 pl.* Akad. Verlagsges. Gustav Fock: Leipzig, 1915.] Nature 107: 485–486. 1921.

760. KLASON, P. **Beiträge zur Kenntnis der Konstitution des Fichtenholz-Lignins. [The constitution of pine wood lignin.]** Ber. Deutsch. Chem. Ges. 53: 1864–1873. 1920.—Two distinct complexes are recognized in the lignin molecule. One of these contains the acroleïn group and is called α-lignin, the other contains a carboxyl group and is called β-lignin. The former has the general formula $C_{22}H_{22}O_7$, the latter $C_{19}H_{18}O_9$. It is believed that lignin is not a secondary product of cellulose, but that it is formed directly in the assimilation process.—*Henry Schmitz.*

761. KLASON, P. **Über Lignin und Lignin-Reactionen II. [Concerning lignin and lignin reactions II.]** Ber. Deutsch. Chem. Ges. 53: 1862–1864. 1920.—Working with lignin obtained from various woods, Klason finds that the lignin molecule is not necessarily always the same, but it always contains the acroleïn complex, R·CH:CH·CHO, and that the various color reactions are dependent upon the presence of this complex.—*Henry Schmitz.*

762. KOHLER, D. **Étude de la variation des acides organiques au cours de la pigmentation anthocyanique. [The variation of organic acids during anthocyanic pigmentation.]** Rev. Gén. Bot. 33: 295–315, 337–356. *Fig. 1.* 1921.—The author first considered plant organs in which the pigmentation occurred normally. She found that in the corolla of *Cobaea scandens*, as well as in the leaves of *Ampelopsis tricuspidata*, the formation of anthocyan is correlative with an increase in the amount of organic acids. It was noted that as long as the organ in question was not pigmented, the amount of organic acids did not vary appreciably, and that the increase was produced only at the moment of pigmentation (corollas of *Cobaea scandens*). Further, the amount of acid increased regularly as the pigmentation became more intense (leaves of *Ampelopsis tricuspidata*). In the hypocotyl axes of buckwheat, however, the formation of

anthocyan is accompanied by a decrease in the amount of organic acids.—Secondly, the relation of pigmentation and organic acids was studied in organs cut from the plant which produced them. In the 3 cases studied, corollas of *Cobaea scandens*, leaves of *Ampelopsis tricuspidata*, and the hypocotyl axes of buckwheat, the formation of anthocyan was never accompanied by an increase of acid.—*J. C. Gilman.*

763. MINOR, JESSIE E. **The reactions of cellulose.** Paper 26: 584–587. 1920.—Data are given to show that certain theories of the relation of dyes to cellulose are not tenable.—*H. N. Lee.*

764. WEIMER, J. L., AND L. L. HARTER. **Glucose as a source of carbon for certain sweet potato storage-rot fungi.** Jour. Agric. Res. 21: 189–210. 1921.—*Fusarium acuminatum, Diplodia tubericola, Rhizopus Tritici, Mucor racemosus, Sclerotium bataticola, Penicillium* sp., *Botrytis cinerea*, and *Sphaeronema fimbriatum*, all of which cause decays of sweet potato (*Ipomoea batatas*), were grown on modified Czapek solution for 2 weeks at 28°C., a carbon source being supplied by differing amounts of glucose. All the organisms except *Sphaeronema fimbriatum* utilized glucose in considerable amounts. The amount of glucose actually consumed at any concentration differed with the organism, and in general the greatest consumption occurred in the weaker solutions (10 per cent), decreasing progressively with increasing concentration. Five of the organisms grew in solutions containing 42–50 per cent glucose, but *Penicillium* sp. alone grew in a 58 per cent solution.—Dry weight of fungous material varies with the species and with the concentration of glucose, for example, *Botrytis cinerea* produced a maximum (1.0215 gm.) on 30 per cent glucose and *Rhizopus Tritici* a maximum (0.4716 gm.) on 10 per cent. There is similar variation in the amount of glucose required to produce 1 gm. of dry material. The "economic coefficient" for *Mucor racemosus* is greatest (28.88) on 30 per cent solution and lowest (1.44) on 50 per cent solution, while for *Rhizopus Tritici* it is greatest (17.67) on 50 per cent solution and least (3.70) on 10 per cent solution.—*Fusarium acuminatum, Sclerotium bataticola*, and *Sphaeronema fimbriatum* affect the hydrogen-ion concentration of the medium very slightly, while the remaining 5 organisms increase the acidity appreciably.—All the fungi grow in solutions with maximum osmotic pressure varying from 81.33 to 101.46 atmospheres. *Fusarium acuminatum* and *Mucor racemosus* show an increase in total osmotic concentration, while the remaining fungi, in general, decreased the concentration.—*D. Reddick.*

765. WITZEMANN, EDGAR J. **The law of probability applied to the formation of fats from carbohydrates.** Jour. Phys. Chem. 25: 55–60. 1921.—From data on the occurrence of the various fatty acids in nature the author constructs a curve. This he considers from the standpoints of probability, the general facts concerning fats in plants and animals, and the 2 general types of hypotheses dealing with the chemical steps in fatty-acid formation from carbohydrates, as follows: (1) The fatty acids "are built up mainly from short carbon chains (less than 6)." (2) "They are built up mainly from units of 6 carbon atom chains." The author concludes that the evidence is in favor of the second hypothesis.—*H. E. Pulling.*

METABOLISM (RESPIRATION, AERATION)

766. HARTER, L. L., AND J. L. WEIMER. **Respiration of sweet potato storage-rot fungi when grown on a nutrient solution.** Jour. Agric. Res. 21: 211–226. 1921.—The fungi included in the study are: *Fusarium acuminatum, Sclerotium bataticola, Diplodia tubericola, Penicillium* sp., *Mucor racemosus, Botrytis cinerea*, and *Rhizopus Tritici*. A modified Czapek solution, in which ammonium nitrate was substituted for sodium nitrate, and with the addition of 10 per cent dextrose, was used as a culture medium. *Penicillium* sp., *Botrytis cinerea*, and *Sclerotium bataticola*, which grew slowly, produced a maximum of more than 2 gm. of carbon dioxide in 24 hours. The other organisms, which grew rapidly, produced a comparatively small amount of carbon dioxide and reached their maximum soon after the culture flask was inoculated. The 3 slow-growing fungi produced a relatively large amount of dry matter and consumed nearly all of the glucose; the reverse is true of the remaining organisms. The quantity

of carbon dioxide evolved does not necessarily correlate either with the amount of dry matter formed or with the amount of glucose reduced. The 3 slow-growing fungi produced more than 1 gm. of carbon dioxide for each gm. of glucose. For the remaining organisms the ratio was less than unity, while the dry weight of material produced for each gm. of glucose consumed was in all cases less than unity. The coefficient of respiration varies from 0.83 to 2.01, the economic coefficient from 3.86 to 22.86. The amount of carbon dioxide produced is not the amount theoretically possible from the sugar consumed. Alcohols and acids are possible products, and alcohol production is definitely established for *Fusarium acuminatum*, *Rhizopus Tritici*, and *Diplodia tubericola*.—*D. Reddick.*

GROWTH, DEVELOPMENT, REPRODUCTION

767. ANDRE, HANS. **Über die teleologische und kausale Deutung der Jahresringbildung des Stammes. [On the teleological and causal meaning of annual ring formation in stems.]** Naturwissenschaften 8: 998–1006, 1021–1027. 1920.—This is a brief discussion largely on the basis of general observations and of earlier, published, experimental work. In the treatment of causal relations the author considers the factors to be (a) physical, such as the changing pressure of the cortex; (b) physico-chemical, illustrated by the influence of mineral substances and organic nutrients in determining the sizes of the vessels; and (c) "stimuli," notably such formative stimuli as water and the variable pull and pressure on the cells of the cambium.—*Orton L. Clark.*

768. DOWLING, JOHN J. **Observations of plant growth with the recording ultramicrometer.** Nature 107: 523. *1 fig.* 1921.—This is a description of the apparatus which has shown "pulsations of growth" as described by Bose.—*O. A. Stevens.*

769. EREKY, K. **Die Steigerungsmöglichkeiten der landwirtschaftlichen Lebensmittelproduktion. [The possibility of increasing the production of agricultural foods.]** Naturwissenschaften 8: 1033–1038. 1920.—The relative efficiency of the different crops grown under the same conditions is shown by a comparison of the number of calories which the products represent. Sugar beets are 1st with a production of 22.3 million calories per hectare, followed by potatoes, 9.5, barley, 6.8, oats, 6.2, wheat, 5.4, and rye, 4.9. This account is designed to convey general information concerning the capacity of the plant to utilize light and CO_2 in the production of agricultural foods. Other aspects of food production are discussed.—*Orton L. Clark.*

770. FITTING, HANS. **Das Verblühen der Blüten. [The withering of flowers.]** Naturwissenschaften 9: 1–9. *Fig. 1–11.* 1921.—The mechanics of leaf fall brought about by an abscission layer applies also to the fall of many flowers. There are several distinctive types. There is, however, a significant reaction concerned which is considered a true stimulation process and termed "chorism." Important is the effect of fertilization, which is elaborated by many striking examples. The function of hormones from the pollen and pollen tubes is treated in some detail. Often the same process (fertilization) will prolong the life of flowers of one species (*Listera ovata*) while it shortens the life of those of other genera and species.—*Orton L. Clark.*

771. LEVY, FRITZ. **Neuere Untersuchungen auf dem Gebiete der Zellteilungs-Physiologie. [Recent experiments in the field of the physiology of cell division.]** Naturwissenschaften 9: 105–110. 1921.—The author considers in a general way the influence of growth factors and of division factors in the physiology of cell division.—*Orton L. Clark.*

772. MACDOUGAL, D. T. **Growth in trees.** Proc. Amer. Phil. Soc. 60: 7–14. *Pl. 1.* 1921.—This paper, read before the American Philosophical Society, was presented as a synopsis of a more extensive manuscript to be published by the Carnegie Institution. Two new instruments, the dendrograph and dendrometer, designed for obtaining measurements of growing trees, are described and illustrated. Measurements made in 1919 and 1920 of a number of evergreen and deciduous trees in various habitats are listed and generalizations summarized.—*Wanda Weniger.*

GERMINATION, RENEWAL OF ACTIVITY

773. Jones, Henry A. **Preliminary report on onion dormancy studies.** Proc. Amer. Soc. Hort. Sci. 17: 128–133. 1920 [1921].—The onion bulb, when harvested just after the top has fallen, has a true dormant period. Yellow Globe Danvers onions grown from seed in 1919 were found to have a dormant period of 2–3 months, varying with the individual specimens. The dormant period can be abbreviated and top and root growth initiated by transversely bisecting the bulb. In dormant bulbs a light wounding of the basal end (root region) will initiate root growth, but not top growth. Transversely cutting the bulb,—thereby removing the upper portion of the scales over the entire bulb,—may allow the escape of a gas or gases toxic to growth or it may permit the entrance of the oxygen necessary for growth. Removal of a longitudinal portion of several outside scales does not induce root or top growth.—*H. A. Jones.*

774. Lopriore, G. **Sulla germinazione dei semi verdi.** [Note on the germination of green seeds.] Staz. Sper. Agrarie Ital. 53:414–418. 1920.—The present note deals with the phenomenon of chlorophyll retention by the cotyledons of various seeds. The author found that the germination of seed of *Faba*, which presented a green pigmentation, was only 20 per cent as compared to the normal behavior of normal seed. As a contrast to these findings the author mentions some results which he obtained on the retention of chlorophyll by the cotyledons of *Pistacia*. Some developing fruits were enclosed in black sacks in early spring while others were left in the open, and all were examined in September when the seed growing in a normal environment had attained maturity. A weight comparison of the 2 groups showed a marked advantage in the case of the seed normally exposed. The seed of the darkened drupes when placed in conditions favoring germination failed to germinate and actually decomposed. Moreover, such seed, unlike normal seed, were lacking in true chlorophyll. Other analogous cases are found among citrus plants, the seed of which are often found to germinate within the fruit with the formation of true chlorophyll. The author limits himself, however, to the enumeration of interesting cases.—*A. Bonazzi.*

775. Parkin, John. **Vitality of gorse seed.** Nature 107: 491. 1921.—The author reports that seed dormant in soil for 26 years germinated and grew to maturity. (Supplementary to report in Nature 102: 65. 1918.)—*O. A. Stevens.*

TEMPERATURE RELATIONS

776. Hooker, Henry D. **Pentosan content in relation to winter hardiness.** Proc. Amer. Soc. Hort. Sci. 17: 204–207. 1920 [1921].—The author advances a new theory of hardiness. He suggests, "The pentosans, or rather some specific pentosan, function in the plant tissue by holding water which is in the nature of absorbed or colloidal water, and that this type of water actually does not freeze when the plant is subjected to ordinary winter conditions. The greater water content of tender tissue as compared with hardy tissues would be due, therefore, to an excess of free water. Though hardy tissues contain less free water they contain more absorbed or colloidal water."—Shoots of hardy varieties of apple, like Wealthy and Yellow Transparent, had higher pentosan content than the more tender varieties, like the Missouri Pippin and Stayman Winesap. In most cases the base of the shoot had a higher pentosan content than the tip. Investigations on long, immature green shoots and short, well-matured shoots of Ben Davis, showed that the latter had a much higher pentosan content. Results of analyses on the currant and raspberry, also, show a correlation between pentosan content and ability to resist low temperatures. Samples for analysis were taken on November 8, and December 2; the results are expressed in percentages on the basis of fresh weight.—*H. A. Jones.*

777. Kenoyer, L. A. [Rev. of: Coville, Frederick V. **The influence of cold in stimulating the growth of plants.** Jour. Agric. Res. 20: 151–160. 1920 (see Bot. Absts. 8, Entry 378).] Jour. Indian Bot. 2: 154–155. 1921.

778. ROSA, J. T., JR. **Pentosan content in relation to hardiness of vegetable plants.** Proc. Amer. Soc. Hort. Sci. 17: 207–210. 1920 [1921].—A close correlation is shown to exist between pentosan content and vegetable plants in various conditions of hardiness. Plants hardened by exposure to low temperature or by withholding moisture showed much higher pentosan content than non-hardened plants. There is a gradual increase in pentosan content accompanying the hardening process. The following data, expressed in percentages in terms of fresh weight, show how much the pentosan content increases in going from the non-hardened to the hardened state: Cabbage, 0.207 to 0.604; cauliflower, 0.191 to 0.403; leaf lettuce, 0.106 to 0.402; and tomato, 0.091 to 0.362.—The author advances the theory, "that hardened plants contain a greater proportion of 'absorbed' water in colloidal combination with the pentosans of the protoplasm, which is not frozen upon exposure to moderate freezing temperatures. The protoplasm of hardened plants apparently possesses a greater water-holding power than non-hardened plants, which may be accounted for by the fact that hardened plants have been found to contain increased amounts of pentosans roughly proportional to the degree of hardiness."—*H. A. Jones.*

RADIANT ENERGY RELATIONS

779. KAYSER, E. **Influence des radiations lumineuses sur l'Azotobacter. [The influence of luminous radiations on Azotobacter.]** Compt. Rend. Acad. Sci. Paris 172: 491–493. 1921.—In 2 previous papers [Compt. Rend. Acad. Sci. 171: 969–971. 1920 and 172: 183–185. 1921]; the author has reported the influence of different generations of the organism upon the capacity of *Azotobacter* to fix nitrogen, also the influence of different colored lights and of darkness; likewise the relation to carbohydrate consumed. The experiments reported in the present paper constitute a study of nitrogen fixation by *Azotobacter* of the 12th generation, likewise the effect of changing the color of the radiations. Organisms which had been cultivated to the 12th generation under green rays, were placed in 2 separate glasses containing the nutrients; one was exposed to green and the other to yellow rays. This was repeated for the other colors. The 12th generation in all cases fixed less total N than the 6th. In all cases, except the one where blue was replaced by yellow, an increase of the total N fixed followed a change of color in the light. Likewise in 4 of the 6 cases, white to blue and green to yellow being the exceptions, change of color in the rays was responsible for the increase in N fixed per gram of carbohydrate decomposed.—*L. J. Klotz.*

TOXIC AGENTS

780. B. [Rev. of: WINTERSTEIN, HANS. **Die Narkose in ihrer Bedeutung für die allgemeine Physiologie. (The significance of narcosis in general physiology.)** *319 p.* J. Springer: Berlin. 1919. *Unbound, 16 marks; bound, 18 marks.*] Zeitschr. Phys. Chem. 96: 377. 1920.

781. BURGESS, KENNETH E. **The toxicity towards Staphylococcus of dilute phenol solutions containing sodium benzoate.** Jour. Phys. Chem. 24: 738–740. 1920.—The author concludes that the phenomena observed by Lemon (see Bot. Absts. 10, Entry 786), which were not in accord with Miller's hypothesis (see Bot. Absts. 10, Entry 787) of the alteration of chemical potential of phenol solutions by salts, were produced by injury of the Staphylococcus cells due to low concentration of the medium, thus confirming the results of Laird (see Bot. Absts. 10, Entry 784).—*H. E. Pulling.*

782. FRAZER, CHAS. G. **Methylene blue as indicator in determining the toxicity of phenol and phenol-salt solutions towards yeast.** Jour. Phys. Chem. 25: 1–9. 1921.—Solutions containing phenol and sodium chloride, of such compositions as to be in equilibrium with the same solution of phenol in toluene or in kerosene, are isotoxic towards yeast if the ability of the cells to stain with methylene blue be adopted as a criterion of death. If inability to form colonies on wort-agar be adopted, the solutions containing salt are more toxic than the phenol solutions of the same chemical potential (see Bot. Absts. 10, Entry 787). It is suggested that cells may lack the power to form colonies and yet not be "dead," since "emaciated" cells are generally believed to lack this power, thus less poisoning would be required to produce this condition

than that indicated by the methylene blue test. The use of "other media would undoubtedly lead to other data, and by their use milestones could be marked along the road to death, and the rates of loss of vitality and of recovery could be followed quantitatively."—*H. E. Pulling.*

783. FULMER, ELLIS I. **The effect of alcohol on the toxicity of phenol towards yeast.** Jour. Phys. Chem. 25: 10–18. 1921.—If inability to grow colonies on wort-agar be taken as the criterion of death, solutions containing water, phenol, and 3.75 per cent alcohol are more toxic than the chemically equivalent solutions (see Bot. Absts. 10, Entry 787) without alcohol; but if inability to stain with methylene blue be taken as the criterion, they are equally toxic. A method for obtaining cultures free from "resting cells" (those more resistant to hot water and to toxins than are actively growing cells) is described.—*H. E. Pulling.*

784. LAIRD, J. STANLEY. **The chemical potential of phenol in solutions containing salts; and the toxicity of these solutions towards anthrax and Staphylococcus.** Jour. Phys. Chem. 24: 664–672. 1920.—The irregular results obtained by Lemon (see Bot. Absts. 10, Entry 786) induced the author to repeat the experiments and to re-determine the chemical potential of the solutions. Lemon's results are stated to be due to injury of the cells because of the low concentration of the medium, 2 atmospheres being the lowest osmotic pressure that the organisms could withstand without injury. Ten salts were used with results in harmony with Miller's hypothesis (see Bot. Absts. 10, Entry 787). Solutions of phenol to which acetic acid was added were, however, more toxic than expected.—*H. E. Pulling.*

785. LAIRD, J. STANLEY. **The toxicity of mercuric chloride and its solubility in aqueous alcohol.** Jour. Phys. Chem. 24: 736–737. 1920.—Paul and Krönig (Zeitschr. Phys. Chem. 21: 448. 1896) using anthrax found a maximum toxicity of solutions of mercuric chloride in water that contained about 25 per cent of alcohol by weight. The author finds a pronounced minimum in the solubility of mercuric chloride in aqueous solution at an alcohol content of 24 per cent, thus supporting Miller's hypothesis (see Bot. Absts. 10, Entry 787) of the relation of chemical potential to toxicity.—*H. E. Pulling.*

786. LEMON, J. S. **The toxicity towards anthrax and Staphylococcus of solutions containing phenol and sodium chloride.** Jour. Phys. Chem. 24: 570–584. 1920.—There are given here the details of part of the investigation on the relation between increased toxicity and increased chemical potential, due to the addition of salt to aqueous solutions of phenol (see Bot. Absts. 10, Entry 787). Experiments with anthrax were in accord with Miller's hypothesis of increase in chemical potential, but in those with Staphylococcus the degree of approximation of hypothesis to result appeared to vary with the concentration of phenol employed.—*H. E. Pulling.*

787. MILLER, W. LASH. **Toxicity and chemical potential.** Jour. Phys. Chem. 24: 562–569. 1920.—The observations are recalled (Scheurlen, Arch. Exp. Path. Pharm. 37: 74. 1895; Paul und Krönig, Zeitschr. Phys. Chem. 21: 414. 1896) that when salts are added in nontoxic concentrations to aqueous solutions of phenol they increase the toxicity of the solution. This increase is explained by the change in chemical potential of the phenol when salt is added to its aqueous solution. A solution of phenol to which salt had been added would have the same toxic effect as the (more concentrated) solution of phenol in pure water that would be in equilibrium with the solution of phenol in a solvent immiscible with water in equilibrium with the first (salt-phenol) solution. The general results of the investigations of several men using anthrax spores, *Staphylococcus*, and yeast are given, the details of which are to be presented by the several investigators.—*H. E. Pulling.*

788. MOLL, FRIEDRICH. **Untersuchungen über Gesetzmässigkeiten in der Holzkonservierung. Die Giftwirkung anorganischer Verbindungen (Salze) auf Pilze.** [**The principles of wood conservation. The toxic action of inorganic compounds (salts) on fungi.**] Centralbl. Bakt. II, Abt. 51: 257–286. 1920.—*Penicillium glaucum* and a species of *Merulius* grown on agar containing different toxic salts develop in inverse ratio to salt concentration. With similar salts the results are much alike. As long as the combined salts do not yield an insoluble

mixture or a complex compound, the single ions retain unchanged their specific influence. The preservative value of any salt can be measured by the sum of the effectiveness of the individual ions into which the molecule dissociates. The poisonous effect is additive. The following are toxic in a descending scale: Ag, Cd, Cn, Zn, Fe, Co, Cr, Fl.—*Fred S. Wolpert.*

789. Wille, Johannes. **Chlorpikrin als Schädlingsbekämpfungsmittel in seinen Wirkungen auf Tier und Pflanze. [Picric chloride as an insecticide and its effect on animals and plants.]** Naturwissenschaften 9: 41–47. *Fig. 1–4.* 1921.—The author reviews recent work on the use of picric chloride for the extermination of insects and other animals. The benefits of using the material while the plant is in a dormant condition and the effects of the material on yeast and other plants are noted.—*Orton L. Clark.*

SOIL SCIENCE

J. J. Skinner, *Editor*

F. M. Schertz, *Assistant Editor*

(See also in this issue Entries 393, 394, 562, 573, 738)

790. Bhatnagar, Shanti Swarupa. **The effect of adsorbed gases on the surface tension of water.** Jour. Phys. Chem. 24: 716–735. 1920.—The values of the surface tension of water in dynes per centimeter in a vacuum and in various gases at 15°C. are: Vacuum, 71.3; hydrogen, 72.83; nitrogen, 73.00; carbon dioxide, 72.85; carbon monoxide, 73.00; air, 73.1.—*H. E. Pulling.*

791. Breckenridge, J. E. **Boron in relation to the fertilizer industry.** Jour. Indust. and Eng. Chem. 13: 324–325. 1921.—Evidence is presented which shows that certain percentages of borax are detrimental to plant growth, but under favorable conditions, such as optimum moisture, good drainage, etc., rapid recovery is noticeable. Corn shows borax poisoning with 6 pounds of borax per acre; potatoes show a stimulating effect when 4 pounds of borax are added per acre, but 8–10 pounds cause injury.—*Henry Schmitz.*

792. Cutler, D. Ward. **Observations on soil protozoa.** Jour. Agric. Sci. 9: 430–444. 1919.—The direct counting method (grating etched on slide) for soil protozoa in liquid gives results entirely comparable to those obtained by dilution cultures. Three species of *Amoeba* and 1 each of *Monas, Bodo, Cercomonas,* and *Oicomonas* were employed.—The factors governing the relation between the protozoa and the soil particles are those of surface action. The capacity of various soils for retaining these organisms is specific and constant and is independent of the concentration of the suspension, the time of action, or whether the suspension contains cysts or active forms.—*D. Reddick.*

793. Griffith, J. W. **Influence of mines upon land and livestock in Cardiganshire.** Jour. Agric. Sci. 9: 366–395. *Pl. 4–16.* 1919.—Lead and zinc compounds (galena and blende) reach the land in deleterious amounts. Physically, the capacity of the soil to retain water is often reduced; and chemically, the nitrogen content is lowered as a result of contamination. Extensive experiments were performed on the effect of galena and blende upon oats and crimson clover. Clover is more susceptible to injury than oats, but both are affected.—Of the remedial measures tried, heavy liming is best, but the use of sodium silicate tends to reduce the injury.—*D. Reddick.*

794. Juritz, C. F. **The agricultural soils of the Union.** South African Jour. Indust. 4: 76–84. 1921.—The grain soils of southwest Cape Province are grouped as follows: Sandstone, Malmesbury, and Bokkeveld soils. The Sandstone and Malmesbury soils are deficient in plant food and humus and are quite often acid; Bokkeveld soils are much richer in plant food. The soils from each region are described geologically and their origin is given.—Considerable variety of soils exists in Cape Province. The grey and reddish loams of the Great Karroo cover the largest portion of the country. The coastal belt in the southwest comprises gravelly clays of a drab color. On the South Coast the soil contains more humus and is frequently acid. Alkali soils, resulting from bad drainage, occur in some parts. In a discussion of the Orange Free State soils it is pointed out that Na_2CO_3 was almost absent from the lighter soils but present in the low lying places.—*J. J. Skinner.*

795. Keen, Bernard A. **A note on the capillary rise of water in soils.** Jour. Agric. Sci. 9: 396–398. 1919.—The following formula is derived: $h = \frac{0.75}{r}$, in which h is the capillary rise and r the radius of the soil grain. This is for an ideal soil in which the grains are all of one size, spherical, and packed in the closest possible manner.—*D. Reddick.*

796. Keen, Bernard A. **A quantitative relation between soil and the soil solution brought out by freezing-point determinations.** Jour. Agric. Sci. 9: 400–415. 1919.—An examination was made of the experimental data of Bouyoucos and his associates on the freezing point depression of soil solution at varying moisture contents. The data, which are mathematical in character, do not lend themselves to abstracting; the reader is therefore referred to the original.—*J. J. Skinner.*

797. Michel-Durand, E. [Rev. of: Waynick, D. D., and L. T. Sharp. **Variations in nitrogen and carbon in field soils and their relation to the accuracy of field trials.** Univ. California Publ. Agric. Sci. 4: 121–139. 1919 (see Bot. Absts. 3, Entry 870).] Rev. Gén. Bot. 33: 77. 1921.

798. Scofield, Carl S., and Frank B. Headley. **Quality of irrigation water in relation to land reclamation.** Jour. Agric. Res. 21: 265–278. 1921.—The soils of certain irrigated areas in western U. S. A. are not readily permeable to water and may be unproductive because of slow absorption from periodic irrigation. This impermeability of soils is due to the effect of sodium on the contained clay. This injurious action does not occur in the presence of appreciable quantities of soluble forms of calcium and aluminum. The use of such substances applied to the land or in the irrigation water serves as a corrective.—*D. Reddick.*

799. Voelcker, J. A. **The Woburn experimental station of the Royal Agricultural Society of England. Field Experiments, 1921.** Jour. Roy. Agric. Soc. England 81: 253–267. 1920.—The annual reports are made on the continuous growing of wheat and barley under different fertilizer treatments. The highest yield of wheat was secured on the plot receiving superphosphate, sodium nitrate, sulphate of ammonia, and lime. Sulphate of ammonia alone has markedly reduced crop yield, but when used with lime good yields are secured.—Lump lime produced less yield than did ground limestone.—Reports are made on the relative value of chalk and lime and the effect of different forms of lime on grass.—*J. J. Skinner.*

800. Voelcker, J. A. **The Woburn experimental station of the Royal Agricultural Society of England. Pot culture experiments.** Jour. Roy. Agric. Soc. England 81: 267–277. 1920.—Pot experiments with corn to determine the effect of stannous and stannic oxides, chlorides, and sulphates were made. In general it is shown that the effect of stannic salts is decidedly more marked than that of stannous in either stimulating the crop or producing a toxic effect, and that the chlorides have a more marked effect than the oxides. Tin as a metal appears to have no direct effect upon vegetation. Where differences are shown it is due to the acid radical and not to the metal. Tin oxide showed no effect in amounts up to 0.10 per cent Sn. Chlorides of tin have a favorable effect up to 0.1 per cent Sn as stannous chloride, but with stannic chloride only up to 0.05 per cent Sn; 0.1 per cent Sn as stannic chloride was distinctly harmful. Stannous sulphate has no effect when used up to 0.1 per cent Sn, but stannic sulphate at this concentration is distinctly beneficial.—Chromate and bichromate of potash proved very harmful to barley, 0.005 per cent effectually preventing growth.—Experiments with wheat in pots with iron sulphate showed that there was a marked retardation where 0.2 per cent iron was used. The toxic effect of iron was overcome by lime.—Calcium silicate in quantities up to 4 tons per acre produced a beneficial effect upon wheat on soil from the stockyard field. Magnesium silicate and aluminum silicate had no influence.—Sulphur in amounts of 100 and 200 pounds per acre produced only a slight increase with mustard and a slight decrease with clover and lucerne. Experiments were conducted to determine the relative effects of lime and chalk. Lime produced substantial increases with wheat and barley, while chalk produced practically no increased growth.—*J. J. Skinner.*

TAXONOMY OF VASCULAR PLANTS

J. M. Greenman, *Editor*
E. B. Payson, *Assistant Editor*

(See also in this issue Entries 399, 400, 451, 482, 488, 491, 642, 752)

GENERAL

801. Benoist, R. **Contribution a l'étude de la flore des Guyanes; plantes recoltées en Guyane Francais en 1913 et 1914 (suite). [A contribution to the study of the flora of Guinea; plants collected in French Guinea in 1913 and 1914.]** Bull. Soc. Bot. France 66: 357–370, 381–398. 1919.—One hundred and twenty-three genera and 220 species are listed, including the following new species: *Protium plagiocarpium*, *Sclerolobium albiflorum*, and *Inga tubaeformis*.—*M. A. Raines.*

802. Bews, J. W. **An introduction to the flora of Natal and Zululand.** *8vo, vi + 248 p.* City Printing Works: Pietermaritzburg, 1921.—This work is introduced by a brief history of botany in Natal and a selected bibliography. A key to the families precedes the enumeration of genera and species, which are without description. Habit, habitat, and general distribution are recorded in most cases.—*J. M. Greenman.*

803. Cryer, John. **Adventive plants on waste ground, Bradford, York, 1919.** Bot. Soc. and Exchange Club British Isles Rept. 5: 719. 1919 [1920].

804. Druce, G. C. **Additions to the Berkshire flora.** Bot. Soc. and Exchange Club British Isles Rept. Suppl. 5: 443–480. 1918 [1919].

805. Druce, G. C. **Hayward's botanists' pocket book, containing the chief characteristics of British plants, with botanical name, common name, soil or situation, colour, time of flowering of every plant arranged under its own order.** *15 ed., xlv + 292 p.* G. Bell & Sons: London, 1919.

806. [Druce, G. C.] [Rev. of: Scully, Reg. W. **Flora of the County of Kerry.** *lxxxi + 406 p., 6 pl. and map.* Hodges, Figgis & Co.: Dublin, 1916.] Bot. Soc. and Exchange Club British Isles Rept. 5: 64–66. 1917 [1918].

807. Grierson, R. **Adventive plants of the Glasgow area.** Bot. Soc. and Exchange Club British Isles Rept. 5: 719–721. 1919 [1920].

808. Haines, H. H. **The botany of Bihar and Orissa. An account of all the known indigenous plants of the province and of the most important or most commonly cultivated exotic ones with map and introduction.** Part 2. *Small 8vo, 224 p.* Adlard & Son & West Newman: London, 1921.—The order of the families in this work is essentially that of Hooker in the "Flora of British India;" the present part includes the families Ranunculaceae to Anacardiaceae. Keys are given to genera under the various families and to the species of the larger genera. Brief descriptions are presented and rather full notes are recorded particularly on distribution, habit, habitat, and time of flowering and fruiting. The following new species and new combinations are included: *Homonoia intermedia*, *Cedrela brevipetiolulata*, *Vitis vitiginea* (*Cissus vitiginea* L.), and *V. alcicorne* (*Tetrastigma alcicorne* Haines). Several new varietal combinations are also mentioned.—*J. M. Greenman.*

809. Marsden-Jones, E. **Plants of Harbury Cutting, Warwickshire.** Bot. Soc. and Exchange Club British Isles Rept. 5: 721–722. 1919 [1920].

810. Sprague, T. A. **Plant nomenclature: some suggestions.** Jour. Botany 59: 153–160. 1921.

PTERIDOPHYTES

811. BARNHART, JOHN HENDLEY. **Aetopteron as a generic name.** Amer. Fern Jour. 10: 111–112. 1920.—The author protests against changing the generic name *Polystichum* to *Aetopteron* as proposed by House (see Bot. Absts. 7, Entry 501).—*F. C. Anderson.*

812. HIERONYMUS, G. **Kleine Mitteilungen über Pteridophyten III.** [Short communications on pteridophytes III.] Hedwigia 62: 12–37. 1920.—In continuation of previous similar articles, the author presents miscellaneous notes concerning the identity, synonymy, and nomenclature of ferns of the genera *Humata, Leptolepia, Tapeinidium, Lindsaya, Pellaea, Notholaena, Cheilanthes, Adiantum, Pteris* and *Elaphoglossum*. The following new combinations are made: *Humata perdurans* (*Davallia perdurans* Christ.), *Leptolepia maxima* (*Leucostegia maxima* Fourn.), *Tapeinidium Moorei* (*Davallia Moorei* Hook.), *Pellaea allosuroides* (*Cheilanthes allosuroides* Mett.), *Notholaena Greggii* (*Pellaea Greggii* Mett.), *Elaphoglossum pallidum* (*Acrostichum pallidum* Beyrich).—*E. B. Payson.*

813. MAXON, W. R. **A neglected fern paper.** Proc. Biol. Soc. Wash. [D. C.] 34: 111–114. 1921.—The writer points out the significance of a paper on ferns published long ago. It appeared in the Canadian Naturalist, Series II, 13: 157–160. 1867, under the title "Review. Ferns: British and Foreign; by John Smith, A. L. S." A list of the transferred names is given.—*J. C. Gilman.*

814. MAXON, WILLIAM R. **New Selaginellas from the western United States.** Smithsonian Misc. Collections 72[5]: 1–10. *Pl. 1–6.* 1920.—Six new species of the *Selaginella rupestris* group from the southwestern United States and Montana are described and each is illustrated by a plate showing the habital characters. The new species are *S. neomexicana, S. eremophila, S. arizonica, S. asprella, S. leucobryoides,* and *S. Standleyi.*—*S. F. Blake.*

815. MAXON, WILLIAM R. **Notes on American ferns—XVI.** Amer. Fern Jour. 11: 1–4. 1921.—The author notes changes and corrections. *Selaginella humifusa* Van Eseltine is renamed *Selaginella floridana* Maxon on account of the former name being invalidated by *S. humifusa* Hieron., applied several years earlier to a plant from Borneo. The species *Lycopodium obscurum* L. was reported in the Amer. Fern Jour. 10: 81. 1920, as *L. dendroideum* Michx. An earlier (Oct. 1900) collection from the same place (De Kalb County) is in the Mohr Herbarium, but was not included in the "Plant Life of Alabama."—The range is extended for *Lycopodium annotinum* L., *Pteretis nodulosa* (Michx.) Nieuwland, and *Pellaea longimucronata* Hook. Distinguishing foliage characters and range are given for *Dryopteris arguta* (Kaulf.) Watt, and *D. filix-mas* (L.) Schott.—*F. C. Anderson.*

SPERMATOPHYTES

816. AMES, OAKES. **Notes on New England orchids. I. Spiranthes.** Rhodora 23: 73–85. *Pl. 127–129.* 1921.—The author discusses the distinguishing characters of the genus, its variations and its range; also the difficulties encountered in distinguishing between *S. cernua* L. C. Rich., *S. odorata* Lindl., and *S. vernalis* Engel. & Gray, and states that he is convinced that *S. odorata* is conspecific with *S. cernua*. The latter species exhibits a surprising range of variation and, as far as has been observed, presents a different habital and floral aspect until the limit of vigor of the vegetative system is attained; the present author believes that the attempts to segregate new species from it have resulted from a misunderstanding of the life history of this species. He expresses it as his opinion that the range of variation exhibited represents different stages of development. The situation in this species at different stages in its growth is described. Polyembryony is found to be the only sure guide for distinguishing *S. cernua* var *ochroleuca* from the true species, in which the seeds are normal. The species is always found in upland meadows or woodlands and the variety in bogs. The author feels that it would be well worth while to ascertain by cultural experiments whether or not this is due to the nature of the soil in which the plants grow, and whether or not it prevails throughout the range of the species. The situation in *S. vernalis* is discussed. As far as northern forms are

concerned, it may be simply a hybrid between *S. cernua* and *S. gracilis*. In Texas, however, great difference in the seasons of anthesis of the supposed parents appears to render such a crossing improbable. The hybrid form is fully described and illustrated. Pollination in *Spiranthes* is discussed. The writer comments upon Rudolf Schlechter's revision of the *Spirantheae* as related to the American species, discussing the nomenclature of *S. Amesiana* Schltr., *S. ovalis* Lindl., *S. plantaginea* (Raf.) Torr., and tabulates the changes made necessary by this revision in the nomenclature of several American species that are native of the U. S. A. These species as they now stand are: *Mesadenus lucayanus* (Britton) Schltr., *Cyclopogon cranichloides* (Grieseb.) Cogn., *Centrogenium setaceum* (Lindl.) Schltr. *Stenorrhynchus* is retained in the original conception of that genus; representatives are found in the southern U. S. A.—*James P. Poole.*

817. BLAKE, S. F. **A new Aspilia from Trinidad.** Proc. Biol. Soc. Washington [D. C.] **34**: 119–120. 1921.—*Aspilia nigropunctata* is described as a new species.—*J. C. Gilman.*

818. BLAKE, S. F. **New Meliaceae from Mexico.** Proc. Biol. Soc. Washington [D. C.] **34**: 115–118. 1921.—*Cedrela ciliolata, Guarea chiapensis, G. excelsa dubia, G. hetrophylla,* and *G. polyantha* are described as new species.—*J. C. Gilman.*

819. BLATTER, E., F. HALLBERG, AND C. MCCANN. **Contributions towards a flora of Baluchistan.** Jour. Indian Bot. **1**: 344–352. 1920.—This is the final installment of the flora of Baluchistan which the authors have been working up according to Bentham and Hooker's classification from collections made by Col. J. E. B. Hotson, and includes the families Urticaceae to Coniferae. Throughout the entire work localities of collections are detailed, and time of flowering and fruiting, vernacular names, and uses of the plants are given when known. The entire flora includes:

	FAMILIES	GENERA	SPECIES AND VARIETIES	NEW SPECIES
Dicotyledons	57	222	406	11
Monocotyledons	9	43	59	0
Gymnosperms	2	2	4	0
Total	68	267	469	11

The largest families are: Cruciferae, 12 genera and 23 species; Leguminosae, 28 genera and 55 species; Compositae, 23 genera and 37 species; Asclepiadaceae, 11 genera and 13 species; Labiatae, 11 genera and 18 species; Chenopodiaceae, 9 genera and 20 species; and Gramineae, 30 genera and 41 species. The Gymnosperms are represented by *Ephedra*, 3 species; and *Juniperus*, 1 species. [See also Bot. Absts. 6, Entries 342, 343.]—*Winfield Dudgeon.*

820. DANSER, B. H. **Bijdrage tot de kennis van eenige Polygonaceae.** [Contribution to the knowledge of some Polygonaceae.] Nederland. Kruidk. Arch. 1920: 208–250. *1 fig.* 1921.—This article contains notes about Dutch Polygonaceae and the description of a new *Rumex*, *R. obovatus*, closely allied to *R. pulcher*, which is only adventive in the Netherlands. Besides, the following new varieties are described: *Polygonum amphibium* var. *brachystylum*, var. *macrostylum*, var. *pallidiflorum*, var *roseiflorum*; *P. Persicaria* var. *glabripes*; *Rumex Acetosa* var. *albida*, var. *androgyna*, var. *feminea*, var. *mascula*, var. *rubida*, var. *rubra*; *R. Acetosella* var. *rubella*, var. *rubida*, and a new name, *R. callianthemus* (*R. obtusifolius* × *maritimus*).—*W. H. Wachter.*

821. DRUCE, G. C. **Potamogeton Drucei Fryer in Fryer's correspondence.** Bot. Soc. and Exchange Club British Isles Rept. **5**: 713–718. 1919 [1920].

822. DRUCE, G. C. [Rev. of: BEAUVARD, GUSTAVE. **Monographie du genre Melampyrum.** Mem. Soc. Phys. et Hist. Nat. Genève **38**: 290–656. *25 fig.* 1916.] Bot. Soc. and Exchange Club British Isles Rept. **5**: 66–68. 1917 [1918].

823. [DRUCE, G. C.] [Rev. of: LINDMAN, C. A. M. **Svensk Fanerogamaflora.** *viii + 639 p.* 1918 (see Bot. Absts. 8, Entry 727).] Bot. Soc. and Exchange Club British Isles Rept. 5: 599–603. 1919 [1920].

824. DRUCE, G. C. [Rev. of: ROLFE, R. A. **The British marsh Orchises.** Orchid Rev. 26: 162–166. 1918.] Bot. Soc. and Exchange Club British Isles Rept. 5: 608–612. 1919 [1920].

825. GAY, J. **Channel Island plants.** Bot. Soc. and Exchange Club British Isles Rept. 5: 138–142. 1917 [1918].—*Senecio erraticus* Bertol. and *Jasione perennis* Lam. are given.—*G. C. Druce.*

826. GREGORY, E. S. **Some notes on British violets, with additional localities.** Bot. Soc. and Exchange Club British Isles Rept. 5: 148a–148g. 1917 [1918].

827. HENRARD, J. TH. **Bijdrage tot de kennis der Nederlandsche Adventiefflora.** [**Contribution to the knowledge of the Dutch introduced flora.**] Nederland. Kruidk. Arch. 1920: 251–257. 1921.—Critical remarks are given on the following grasses introduced in the Netherlands: *Panicum barbipulvinatum* Nash, *Cenchrus pauciflorus* Benth., *Sporobolus Berteroanus* Hitch. & Chase.—*W. H. Wachter.*

828. HOLM, THEO. **Chionophila Benth. A morphological study.** Amer. Jour. Sci. 1: 31–38. *15 fig.* 1921.—The genus *Chionophila* is closely related to *Chelone* and *Pentstemon*. As now characterized the genus is monotypic with the species *Chionophila Jamesii* Benth. of the higher mountains of Colorado and Wyoming. Formerly the genus included *C. Tweedyi* Henders, of Montana and Idaho, but this species is now placed in the genus *Pentstemonopsis*, intermediate between *Chionophila* and *Pentstemon*. *Chionophila Jamesii* is characterized at length, also the internal structure of the roots, the flower-bearing stem, and the leaf, receives special attention. Ten figures illustrate the flower, fruit, and the internal structure of the vegetative organs. *Pentstemonopsis* is contrasted and the conclusion is reached that it is a good genus. Five figures give the details of flower and fruit.—*T. J. Fitzpatrick.*

829. HOLM, THEO. **Studies in the Cyperaceae. XVII. Notes on Carex podocarpa R. Br., C. montanensis Bailey, C. venustula Holm, C. Lemmoni W. Boott, and C. aequa Clarke.** Amer. Jour. Sci. 48: 17–26. *Fig. 1–12.* 1919.—Robert Brown's *Carex podocarpa* has been entirely misunderstood, and according to C. B. Clarke (in litt.) the specimen so named by R. Brown has proved to be a young specimen of *C. rariflora* Sm. *C. montanensis* has been referred to *C. podocarpa* by Kükenthal, but erroneously so, since *C. rariflora* is phyllopodic. A brief discussion is given relative to the systematic position of *C. montanensis* being a near ally of *C. venustula* and *C. spectabilis* Dew.; furthermore of *C. Lemmoni*, which for the last 30 years has been identified as *C. ablata* Bail.; it is a member of the *Stenocarpae* Holm. *C. aequa* is the species which W. Boott enumerated as *C. fulva* var. *Hornschuchiana* (Bot. of California); its affinity is with *C. diluta* M. Bieb. of the *Spirostachyae* Drej.—*Theodore Holm.*

830. HOLM, THEO. **Studies in the Cyperaceae. XXVIII.** Amer. Jour. Sci. 49: 195–206. *15 fig.* 1920.—An extended study and diagnosis of *Carex Franklinii* Boott and *C. spectabilis* Dewey is presented. *C. Franklinii* was first found by Drummond in the Rocky Mountains at about latitude 59°. It was not again collected until recently by James M. Macoun in Alberta. A conspectus of the section *Stenocarpae*, to which the species belongs, is given. *C. spectabilis* belongs to the section *Melananthae*. Of this species 2 new forms and 3 new varieties are delimited.—*T. J. Fitzpatrick.*

831. HOLM, THEO. **Types of Canadian Carices.** Canadian Field Nat. 33: 72–77. 1919.—Among the 39 greges enumerated by the writer in "Greges Caricum" (Amer. Jour. Sci. 16: 1903) only 5 are absent from Canada, namely: *Psyllophorae* (Europe and Azores), *Chionanthae* (Europe), *Leucocephalae* (Virginia), *Echinochlaenae* (Australia), and *Podogynae* (Japan). In Canada the *Microrhynchae*, *Acorastachyae*, *Echinostachyae*, and *Physocarpae* are the best represented, being rich in species and widely distributed. Considered altogether the genus

Carex in Canada is rich in types, some being confined to this continent, others being known also from Eurasia. The arctic element Canada shares mostly with Europe, and several species are circumpolar; many of the Canadian Carices represent alliances analogous to those of the Old World, exemplified by types of a corresponding habit and structure. Canada besides is the home of certain ancestral types which are absent from Europe. In other words several of the greges are more amply represented in Canada by possessing these types in connection with the *centrales*, and passing gradually into some more or less deviating *desciscentes*. The presence in Canada of the *Lejochlaenae*, mostly sylvan types of rare morphological structure, and of southern origin, indicates the enormously wide distribution of the genus on this continent, and its ability to adapt itself to the environment, far north and far south.—*Theodore Holm.*

832. Jansen, P., en W. H. Wachter. **Floristische aanteebeningen. XVII.** [**Floristical notes XVII.**] Nederland. Kruidk. Arch. 1920: 145–163. 1921.—This article contains notes about some Orchises of the Netherlands: (1) *Orchis latifolia dunensis* Reichl. f., probably an extreme form of *Orchis incarnata* × *latifolia*. The description in Ascherson-Graebner's "Synopsis" is absolutely wrong, as is shown from the original diagnosis in Reichenbach's "Icones" and the type in the herbarium of the Dutch Botanical Society. (2) *Orchis Traunsteineri*, mentioned from the Netherlands, has always proved to be *Orchis incarnata* × *latifolia* or *Orchis incarnata* × *maculata*. Further notes are given about the small-leaved forms of *Orchis latifolia* and the forms of *Orchis maculata*.—*W. H. Wachter.*

833. Jansen, P., en W. H. Wachter. **Floristische aanteebeningen XVIII: Festuca Schlickumii.** [**Floristical notes XVIII.**] Nederland. Kruidk. Arch. 1920: 164–169. *1 fig.* 1921.—This hybrid, new for the Netherlands, is described, and the divergences from the parents, *Festuca gigantea* and *F. pratensis*, are stated, with an enumeration of the Dutch forms of *F. pratensis*, among which the new form *aristata* is characterized.—*W. H. Wachter.*

834. Jepson, Willis Linn. **The long-lost Carpenteria.** Sierra Club Bull. 1921: 151–153. *2 fig.* 1921.

835. Kloos, A. W., Jr. **De Nederlandsche Euphrasia.** [**The Dutch Euphrasia.**] Nederland. Kruidk. Arch. 1920: 170–207. 1 *fig.* 1921.—A synopsis of, and a key to, the Dutch species of this genus is given. As the Netherlands are not mentioned in the monograph of von Wettstein, the Dutch species may be given here: *Euphrasia lutea* L. (only adventive), *E. litoralis* Fr., *E. odontites* L., *E. montana* Jord., *E. Rostkoviana* Hayne, *E. stricta* Host., *E. nemorosa* Pers., *E. curta* Fr., and *E. gracilis* Fr.—*W. H. Wachter.*

836. Lester-Garland, L. V. **The maritime forms of Matricaria inodora.** Jour. Botany 59: 170–174. 1921.—The various maritime forms of *Matricaria inodora* are grouped under 3 heads. *M. maritima* L. is considered as a variety of *M. inodora*.—*S. H. Burnham.*

837. McKechnie, H. **Notes on some new hybrid orchids.** Bot. Soc. and Exchange Club British Isles Rept. 5: 180–183. *Pl. 14–18.* 1917 [1918].

838. McKechnie, H. **Notes on the genus Orchis.** Bot. Soc. and Exchange Club British Isles Rept. 5: 183–189. 1917 [1918].

839. Pennell, Francis W. **Fagelia diversifolia.** Addisonia 4: 73, 74. *Pl. 157* (*colored*). 1919.—This is an ornamental herbaceous plant native of Colombia, at high altitudes, and is cultivated in gardens in Colombia. It was collected by F. W. Pennell and here described as new.—*T. J. Fitzpatrick.*

840. Pugsley, H. W. **The Jersey Herniaria.** Jour. Botany 59: 179–180. 1921.

841. Ricôme. [Rev. of: Beauvisage, M. **Contribution à l'étude anatomique de la famille des Ternstroemiacées.** (**Contribution to the anatomical study of the family Ternstroemiaceae.**) **Thése de la Faculté des Science de Poitiers.** 1920.] Rev. Gén. Bot. 33: 78. 1921.

842. Riddelsdell, H. J. **The British Rubus-list.** Jour. Botany 59: 174–175. 1921.—Comments are presented on a small manuscript note book completed by the late Rev. W. Moyle Rogers, containing a list of British Rubi, revised and rearranged to April, 1917.—*S. H. Burnham.*

843. Sargent, Oswald H. **A new Caladenia from West Australia.** Jour. Botany 59: 175–176. 1921.—*Caladenia Doutchae* is described as new to science.—*S. H. Burnham.*

844. Sedgwick, L. J. **New Bombay species.** Jour. Indian Bot. 2: 123–131. *3 fig.* 1921.—*Leucas angustissima, Christisonia flammea, Phyllanthus Talboti, Ceropegia fantastica, Boucerosia truncato-coronata,* and *Canscora stricta* are described as new species from the Bombay Presidency, India.—*Winfield Dudgeon.*

845. Soest, J. L. van. **Anthoxanthum odoratum L.** Nederland. Kruidk. Arch. 1920: 140–144. 1921.—The author gives a summary of the principal forms found in the Netherlands. The subvar. *subglabrum* and the subvar. *eu-villosum,* into which the var. *villosum* Loisel, is divided, are new.—*W. H. Wachter.*

846. Trelease, William. **A natural group of unusual black oaks.** Proc. Amer. Phil. Soc. 60: 31–33. *Pl. 2–4.* 1921.—Three black oaks of the southern Mexican mountains were found to bear their fruit in racemes, or, more properly, spike-like clusters. These possess the characters of the section *Erythrobalanus* but differ from most black oaks and agree with all white oaks in maturing their fruit in the course of the season of flowering, instead of deferring fertilization and maturing for a year. These 3 new species, *Quercus Urbani, Q. radiata,* and *Q. Conzattii,* are described and grouped in the new section *Racemiflorae.*—*Wanda Weniger.*

847. Wolley-Dod, A. H. **Rosa spinosissima × rubiginosa × f. cantiana forma nova.** Jour. Botany 59: 178. 1921.

848. Yuncker, Truman George. **Revision of the North American and West Indian species of Cuscuta.** Illinois Univ. Biol. Monogr. 6: 1–141. *Pl. 1–13.* 1920.—A critical study of the material of the genus available in the larger herbaria of this country was made. Fifty-four species are treated, of which 26 are found in the U. S. A. Fourteen species and 16 varieties are described as new. The classification of Engelmann was closely followed by the author. The morphology of the different organs is treated in detail. It was found that the flower offered the best characters for the differentiation of species since it was least affected by the parasitic habits of the plant. Many detailed drawings of flower parts are presented in the 13 plates. Notes are given on the habits of the species. It was found that although some species more commonly occur on certain host plants there is no constancy in this respect and that species cannot be based on their occurrence on specific hosts. Self parasitism was noticed. The genus is divided into 3 subgenera on the basis of style and stigma characters. Engelmann's subgenus *Monogyna* has the styles united; this subgenus contains a single species. The subgenus *Succuta* is used as a designation to include those species having linear-elongated stigmas as distinguished from the capitate stigmas of the subgenus *Grammica.*—The specific treatment includes, in addition to an analytical description, a complete synonymy and references to the specimens examined. A complete bibliography is appended. An index of collections with the name of the collector and number of the species collected is presented at the end of the thesis.—*H. W. Anderson.*

MISCELLANEOUS, UNCLASSIFIED PUBLICATIONS

B. E. Livingston, *Editor*
Sam F. Trelease, *Assistant Editor*

849. Ashworth, J. H. **The Edinburgh meeting of the British Association—local arrangements.** Nature 107: 590–591. 1921.

850. Bancroft, Wilder D. [Rev. of: Clayton, William. **Margarine.** *22 × 14 cm., xi + 187 p.* Longmans, Green and Co.: New York, 1920. $4.75.] Jour. Phys. Chem. 25: 175–177. 1921.

851. Bottazzi, Filippo. **Le finalisme de la vie.** [The finality of life.] Scientia 29: 23–28. 1921.

852. Cunningham, J. Clinton. **Products of the Empire.** *19 × 12.5 cm., 299 p., 78 illus.* Clarendon Press: Oxford, 1921.—Part I. An account of food, drink, oil-seeds, drugs, and tobacco. Part II. Raw materials and the produce of mines.—*Publisher.*

853. Huebner, J. **Dyes and dyeing.** [Rev. of: Mathews, J. Merritt. **Applications of dyestuffs to textiles, paper, leather and other materials.** *xvi + 768 p.* John Wiley and Son: New York; Chapman and Hall: London, 1920.] Nature 107: 421–422. 1921.

854. Kaiser, George B. **Little journeys into mossland. III.—Bryologizing in early spring.** Bryologist 24: 19–20. 1921.—A popular account is presented of the more common mosses met with upon a walk near Crosswicks, New Jersey.—*E. B. Chamberlain.*

855. Palma, Stefano di. **Uso del rifatto nella fabbricazione della cellulosa per carta. [The use of residues from the manufacture of licorice [from Glycyrrhiza glabra L.] in the production of cellulose for paper manufacture.]** Staz. Sper. Agrarie Ital. 53: 393–394. 1920.—The fiber, decolorized with calcium hypochlorite or other bleaching substance, becomes light colored without losing its consistency, contains 6 per cent of ash and about 50 per cent of cellulose, and constitutes, according to the author, a valuable substitute for wood and rags in the manufacture of paper.—*A. Bonazzi.*

856. Pantanelli, E. **Produzione di alcool dal fico d' India. [The production of alcohol from Opuntia.]** Staz. Sper. Agrarie Ital. 53: 451–470. 1920.—After a review of the literature on the subject the author attempts to study the course of natural alcoholic fermentation in the untreated pulp of the fruit of *Opuntia vulgaris* and *O. amyclea*. He found the fermentation to be unsatisfactory owing to the development of a large number of organisms injurious to the fermentation, among them the *Saccharomyces opuntiae* of Ulpiani and Sarcoli. Boiled pulp, or pulp to which had been added 0.03 per cent of potassium metabisulphite, when inoculated with what appears to be a bottom yeast, yielded an excellent liquor with a slightly aromatic ethereal odor and a high alcoholic content (9000 cc. of anhydrous ethylic alcohol for each 100 kg. of pulp). The best results were obtained with the must treated with bisulphite; and the fact was ascertained that, in the fermentation of this corrected raw pulp by a selected culture, a certain quantity of glucoside sugar was utilized for alcohol production—the fermentation thus yielding a greater quantity of alcohol than could be predicted by a consideration of merely the reducing sugars, as such, contained in the fruit. The bisulphite-treated pulp appears to give a better product than the boiled pulp since in the process of boiling the changes caused by the enzymes of the mature fruit are interfered with. Fruit attacked by *Ceratitis capitata* give an unsatisfactory product.—*A. Bonazzi.*

857. Rignano, Eugenio. **Le finalisme de la vie.** [The finality of life.] Scientia 29: 28–40. 1921.

858. Willard, J. T. **Some nutritional characteristics of corn.** Trans. Kansas Acad. Sci. 29: 187–201. 1920.—The author furnishes a popular presentation, comparing the food value of corn with that of other cereals, particularly with reference to stock.—*F. C. Gates.*

Vol. X JANUARY, 1922 No. 3

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ENTRIES 859–1446

AGRONOMY

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(See also in this issue Entries 953, 999, 1001, 1015, 1024, 1048, 1054, 1286, 1303, 1306, 1311, 1320, 1353, 1356, 1358, 1367, 1370, 1371, 1372)

859. ANONYMOUS. **A textile fiber from the hibiscus.** Sci. Amer. Monthly 3: 132. 1921.—The article concerns *Hibiscus cannabinus*.—*C. H. Otis.*

860. ANONYMOUS. **Cane arrowing. [Rev. of an interview of H. T. Easterby, in the "Mercury," an Australian newspaper.]** Australian Sugar Jour. 13: 283. 1921.—The conditions which produce arrowing, or flowering of the cane plant, in the cooler cane-growing areas are not well understood but are mostly attributable to climatic factors. Experiments at the Sugar Experiment Station at Mackay with arrowed and non-arrowed plants of the same variety and age gave a slight yield in favor of the arrowed plants in both the plant and first rattoon crops. A higher percentage of sugar is extracted from the cane in the Ingham-Mourilyan district, where arrowing is usual, than anywhere else in Queensland, except the Lower Burdekin; consequently arrowing conditions need not be greatly feared. Any decrease in the sugar content of the cane in 1921 will probably be due to the great amount of rain late in the season.—*C. Rumbold.*

861. ANONYMOUS. **Cotton research in Egypt.** Sci. Amer. Monthly 2: 356. 1920.—A brief is given of a preliminary report of the Cotton Research Board, Ministry of Agriculture, Cairo, Egypt.—*Chas. H. Otis.*

862. ANONYMOUS. **The world's supply of wheat.** Science 54: 268–269. 1921.—An aggregate estimate is given of the 1921 wheat harvest for 20 countries, according to figures compiled by the U. S. Bureau of Markets and Crop Estimates. The 20 countries included in the estimate are: Canada, Argentina, Chile, Uruguay, Belgium, Bulgaria, Finland, France, Greece, Hungary, Italy, Spain, British India, Japan, Algeria, Tunis, Union of South Africa, Australia, New Zealand, and the U. S. A. A brief comment is made on the wheat prospects for the world. —*Mary R. Burr.*

863. ANONYMOUS. **Varieties of maize and potatoes.** Agric. Gaz. New South Wales 32: 533–535. 1921.—Maize districts are classified and varieties are recommended for various districts. A list of recommended potato varieties is given for different districts.—*L. R. Waldron.*

864. Aston, B. C. **Improvement of poor pasture.** New Zealand Jour. Agric. 21: 192–195. *2 charts.* 1921.—The experiments were made to determine the best method of improving shallow pasture which dries up to a dangerous degree in summer. Five-acre plots were treated with basic slag, limestone rubble and phosphate, limestone rubble, or basic phosphate. Sheep were used to determine the relative value of pasture. The basic slag gave excellent and immediate results while the limestone alone was of least value.—*N. J. Giddings.*

865. Bevan, W. **A new fodder plant, Kudzu (Pueraria thunbergiana).** Cyprus Agric. Jour. 16: 33–34. 1921.—This woody leguminaceous climber has recently attracted attention as a forage crop. In Japan, where it is native, seldom maturing seed elsewhere, it has many uses. The thick roots contain large quantities of starch, used for human food; the stems contain a fine fibre from which cloth is manufactured; while the foliage is valued as fodder for all kinds of stock, horses being especially fond of it. The usual method of establishing a field of Kudzu is to set nursery-propagated plants 10 feet apart each way in the early spring. In some cases the stems attain a length of 60 feet in 3 months.—*W. Stuart.*

866. Bevan, W. **Notes on hemp cultivation.** Cyprus Agric. Jour. 16: 12–14. 1921.—The hemp field is known in Cyprus as "kanavero." Soil of a clayey nature is said to be preferred by the hemp growers. Land intended for hemp is given a deep ploughing after the 1st rain; the 2nd ploughing takes place in October or January; a 3rd ploughing is made a few days before sowing the crop, usually in April or May. After thorough harrowing and levelling the field is irrigated and in about 5 days the seed is sown. Complete instructions as to amount of seed to sow, subsequent cultivation of the plants, cutting and removal of seed, and retting of the hemp are given.—*W. Stuart.*

867. Bevan, W. **Sudan grass.** Cyprus Agric. Jour. 16: 6. 1921.—This excellent fodder grass, if irrigated, gives 3 or 4 cuttings a season; but it also gives a fair yield if not irrigated.—*W. Stuart.*

868. Bevan, W. **The value of seed testing.** Cyprus Agric. Jour. 16: 30–31. 1921.—A small seed-testing station has lately been formed at the Agricultural Department, Nicosia. The writer states that "the object of the tests to be carried out is to ascertain the germinating power of the various seeds belonging to the Department before they are issued out to the public." The Department agrees to undertake, so far as it can, to test without charge the seed sent in by farmers.—*W. Stuart.*

869. Breakwell, E. **Elephant grass [Pennisetum purpureum] at North Ryde.** Agric. Gaz. New South Wales 32: 552. 1921.

870. Breakwell, E. **Popular descriptions of grasses.** Agric. Gaz. New South Wales 32: 537–542. *5 fig.* 1921.—Brief notes are given on species of *Aristida, Hordeum,* and *Agropyron. Aristida Behriana, Hordeum murinum, H. maritimum, Agropyron scabrum,* and *A. pectinatum* are figured. *Hordeum bulbosum,* a perennial, promises well as a cultivated grass. Under cultivation it grows 6 feet tall and yields well.—*L. R. Waldron.*

871. Breakwell, E. **Some germination tests of prickly pear seeds.** Agric. Gaz. New South Wales 32: 579–580. 1921.—Seeds of *Opuntia* spp. were subjected to various treatments and then tested for germination; control lots were also tested. Seeds retained their viability for a period of at least 4 years. Different preparatory treatments did not increase germinating capacity. The work is being continued.—*L. R. Waldron.*

872. Brown, P. E. **The American Society of Agronomy.** Science 53: 344–346. 1921.—Abstracts are presented of papers read at a symposium, "Our present knowledge of methods of corn breeding," held at the Chicago meeting of the society, Dec., 1920.—*C. J. Lyon.*

873. Burkill, I. H. **A note upon plants grown for blue dyes in the north of the Malay Peninsula.** Gardens' Bull. Straits Settlements 2: 426–429. 1921.—The history of indigo growing in the East, and the cultivation of *Indigofera suffruticosa* Mill., *Strobilanthes flaccidifolius* Nees, and *Marsdenia tinctoria* R. Br. within the Malay Peninsula are discussed.—*I. H. Burkill.*

874. CALVINO, MARIO. **El cultivo del mani en Cuba.** **[The cultivation of peanuts in Cuba.]** Rev. Agric. Com. y Trab. [Cuba] 3: 404–408. *4 fig.* 1920.—Preliminary experiments showed that castration of peanut plants did not increase yields. Seed selected from pods containing 2 or more grains yielded twice as much as those from pods containing 1 seed. The addition of lime and stable manure to the soil very materially increased the yield.—*F. M. Blodgett.*

875. CALVINO, MARIO. **Interesantes ensayos de abonos en el cultivo de la caña.** **[Fertilizer experiments with sugar cane.]** Rev. Agric. Com. y Trab. [Cuba] 4: 468–471. *1 fig.* 1921.

876. CALVINO, MARIO. **Interesantes ensayos de encalado en cultivos de frijol negro y de frijol de lima.** **[Liming experiments with black kidney beans and lima beans.]** Rev. Agric. Com. y Trab. [Cuba] 3: 448–449. *1 fig.* 1921.

877. CALVINO, MARIO. **La caña Uba del Natal.** **[The Uba sugar cane of Natal.]** Rev. Agric. Com. y Trab. [Cuba] 4: 504–511. *4 fig.* 1921.—Analyses and yields of the Uba sugar cane compared with other varieties are given.—*F. M. Blodgett.*

878. CALVINO, MARIO. **Nuevas variedades de caña de azúcar.** **[New varieties of sugar cane.]** Rev. Agric. Com. y. Trab. [Cuba] 3: 436–440. *7 fig.* 1921.—An account is given of the results of tests of sugar cane seedlings at the Agronomy Experiment Station of Cuba, including total yield and yield of sugar. Tables are included showing the analyses of the different seedlings.—*F. M. Blodgett.*

879. CALVINO, MARIO. **Nuevo sistema de siembra para la caña.** **[A new system of planting sugar cane.]** Rev. Agric. Com. y Trab. [Cuba] 4: 500–503. *3 fig.* 1921.—Better yields of sugar cane were secured by removing all but 1 central bud from the pieces used for planting and planting this piece with the bud turned upward.—*F. M. Blodgett.*

880. CALVINO, MARIO. **Tratamientos especiales de los trozos de caña que se siembran.** **[Special treatments of pieces of sugar cane used for seed.]** Rev. Agric. Com. y Trab. [Cuba] 4: 512–515. *6 fig.* 1921.—Pieces of sugar cane used for seed were treated in camphor water, cold water, water at 40°C. for 2 hours, water at 50°C. for ½ hour, and water at 60°C. for 10 minutes. The last treatment gave the best sprouting.—*F. M. Blodgett.*

881. CANFIELD, F. D., AND ABEL G. RIOS. **Cane sugar in Mexico.** Louisiana Planter 66: 11–15. *4 fig.* 1921.—The authors discuss the sugar cane industry in Mexico, including methods of growing and harvesting.—*C. W. Edgerton.*

882. COCKAYNE, L. **An economic investigation of the montane tussock-grassland of New Zealand.** New Zealand Jour. Agric. 21: 176–188. *Fig. 1–8.* 1921.—The objects of these experiments, methods of securing data, and the value of results are discussed. The central Otago palatability experiment is described in detail as to soil character, climatic conditions, plants occurring in various parts of the field, and the relative palatability of these plants for sheep.—*N. J. Giddings.*

883. COCKAYNE, L. **An economic investigation of the montane tussock-grassland of New Zealand.** New Zealand Jour. Agric. 21: 324–334. *4 fig.* 1921.—Details are given concerning the relative palatability of the various plants occurring in the central Otago experiment.—*N. J. Giddings.*

884. CORBOULD, MABEL K. **Standardization of wheat varieties.** Monthly Bull. Ohio Agric. Exp. Sta. 6: 116–119. 1921.—The culture of certain new selections would improve the wheat yield in Ohio. A table is given of the relative baking and milling qualities of the Gladden and Red Wave varieties. The growing of such varieties as Gladden, Trumbull, Portage, Poole, Fultz, Goens, Harvest King, Hickman, Valley, and Nigger is urged.—*R. C. Thomas.*

885. CROOKS, J. T. J. **The cultivation of sugar cane and the manufacture of raw sugar in the Philippine Islands.** Internat. Sugar Jour. 23: 498–499. 1921.—For years sugar cane has been grown in the Philippines on the island of Negros, Panay, Mindoro, and Luzon. Recently

centrifugal sugar of 96° polarization has been made in 3 or 4 centrals controlled by American and Spanish capital. The cane cultivated is mostly native and little has been done to improve the crop. On Mindoro, the owners of the central have obtained good results by planting new varieties and using fertilizers. The islands have an ideal climate and great supply of suitable land for growing cane, but labor is scarce.—*C. Rumbold.*

886. Ducomet, V. **A propos des semis de pommes de terre. [Concerning potato seed.]** Jour. Soc. Nation. Hort. France 22: 126–131. 1921.—The author discusses the theory of degeneracy in plants propagated asexually and gives results secured from potato seed. He concludes that the evidence does not justify the belief that sexual reproduction is necessary to the maintenance of vigor and productivity. In his experiments a large percentage of the potatoes produced from seed were inferior to the female parent, morphologically, physiologically, and pathologically.—*H. C. Thompson.*

887. Frierson, L. S. **The value of tilth in agriculture.** Science 54: 193–194. 1921.—Stimulation of plant growth by cultivating the soil, so far as movement of the soil water is concerned, is attributed to moisture conservation and to the fact that minerals left at the surface by evaporation, inaccessible to the feeding roots, are, by cultivation, moved to the subsurface where the roots can utilize them.—*H. L. Westover.*

888. Gaylord, F. C. **Why not good potatoes?** Gard. Mag. 32: 310–312. *5 fig.* 1921.—The author briefly discusses seed selection and methods used in growing potatoes, including varieties, disease treatment, and cultural practices.—*H. C. Thompson.*

889. Gennys, R. H. **Harvest report. Glen Innes experiment farm.** Agric. Gaz. New South Wales 32: 578. 1921.—Yields of 4 wheat and 4 oat varieties are given.—*L. R. Waldron.*

890. Girola, Carlos D. **Destrucción de las plantes invasoras perjudiciales, vivaces y anuales. Instrucciones a los agricultores de la dirección de agricultura de la Republica Argentina. [Destruction of weeds.]** Rev. Agric. Com. y Trab. [Cuba] 3: 383–386. 1920.

891. Good, E. S., L. J. Horlacher, and J. C. Grimes. **A comparison of corn silage and sorghum silage for fattening steers.** Kentucky Agric. Exp. Sta. Bull. 233. *59–89* 1921.—A report is given of a 5-year study of the value of corn and sorghum as silage for feeding steers, considered from the standpoint of yield and cost of production. As regards economy in beef production, sorghum silage proved 92.2 per cent as economical as corn silage.—*W. D. Valleau.*

892. Gouaux, C. B. **Summary of results of fertilizer and other field work with sugar cane for 1919–1920.** Louisiana State Univ. Div. Agric. Ext. Circ. 47. *20 p.* 1921.—Results of fertilizer experiments with sugar cane on various plantations in Louisiana are given.—*C. W. Edgerton.*

893. Green, A. W. **Grass-grub control.** New Zealand Jour. Agric. 21: 174–175. 1920.—The grass-grub (*Odontria zealandica*) is often destructive in small areas of pasture land. Fencing such areas and using them as feed lots for heavy live stock has been found to destroy practically all grubs.—*N. J. Giddings.*

894. Helm, C. A. **Corn in Missouri. II. Field methods that increase the corn crop.** Missouri Agric. Exp. Sta. Bull. 185. *20 p.* 1921.—Experiments on tillage and method and rate of planting and comparative yield tests of corn are briefly discussed.—*L. J. Stadler.*

895. Heriot, T. H. P. **The manufacture of sugar from the cane and beet.** *Illus.* Monographs on Industrial Chemistry. Longmans, Green and Co.: London, 1920.—Part 1. Sugar beet, sugar cane, and other sugar-producing plants. Part 2. Extraction of juice from the cane: principles of the milling process. Part 3. Extraction of sugar from the beet: principles of the diffusion process. Part 4. Composition of cane and beet juices: properties of the sugars. Part 5. Treatment of cane and beet juices: chemical agents used and method of heating the

juice. Part. 6. Evaporation of water from juice: principles of multiple-effect evaporation; types of evaporators used. Part 7. Crystallization: formation and growth of crystals; crystallizing operations. Part 8. Special methods of extracting sugar from molasses: treatment of beet-molasses. Part 9. By-products of cane and sugar-beet factories. Part 10. Refining of cane and beet sugars.—*C. Rumbold.*

896. HERTEL, H. **Landbruget i 1920. [Agriculture during 1920.]** Tidsskr. Landøkonomi 1921 [1]: 1–38. 1921.—The 1920 harvest for the entire nation is stated as follows in millions of dobbeltcentner (200 pounds): Wheat 1.89, rye 3.20, barley 5.13, oats 6.84, buckwheat 0.02. Denmark is endeavoring to raise clover seed for export, but during 1920 the quantity harvested was insufficient even for domestic needs. Experiments with clover seed from Bohemia have demonstrated that the resulting seed is not as good as Danish seed.—*Albert A. Hansen.*

897. KINNEY, E. J., AND GEORGE ROBERTS. **Soybeans.** Kentucky Agric. Exp. Sta. Bull. 232. *23–68.* 1921.—This bulletin reports results of a study of soy beans in Kentucky over a period of more than 7 years. A discussion is given of the utility of the soy bean crop, its value under different conditions as compared with cowpeas, varieties,—with description of the most important ones,—yields of seed and hay, the place of the soy bean in the rotation, culture of soy beans, care of the crop and of soy beans in mixture with corn and other crops. A discussion is also included of the value of soy beans for silage. It is pointed out that soy beans will give good yields on poor fields, which will not successfully raise red clover, thus supplanting clover in the rotation.—*W. D. Valleau.*

898. LIECHTI, P., UND E. RITTER. **Ueber die Wiesendüngung mit Gülle unter besonderer Berücksichtigung der Verwertung des Güllenstickstoffs bei der Grünfuttererzeugung. [Pasture fertilization with liquid manure, with special reference to the utilization of the nitrogen in the production of green feed.]** Landw. Jahrb. Schweiz 35: 1–66. 1921.—This describes plat experiments with liquid manure and other fertilizers for the period 1911–1918, inclusive, in a study of the effect of fertilizer treatment on yield and composition of pasture grasses. Considerable tabulated data are presented giving the results of chemical analyses of the dry matter produced under the various fertilizer treatments.—*J. D. Luckett.*

899. McDONALD, A. H. E. **Trial of Jerusalem artichokes.** Agric. Gaz. New South Wales 32: 587. 1921.—It was found at Wollongbar Experiment Farm that artichokes can not compete with sweet potatoes as fodder for pigs. Sweet potatoes yield more, remain in the ground without rotting, and the surplus crop, if any, can be marketed. Artichokes were found to be more sucessful at Hawkesbury.—*L. R. Waldron.*

900. McGILL, J. **British grasses.** *65 pl.* McGill and Smith, Ltd.: Ayr, Scotland, 1920.—Photographic illustrations of 65 species of British grasses are given, each plate labeled with the common and scientific names and with brief notes of the habit and agricultural value of the grass.—*C. V. Piper.*

901. MAIDEN, J. H. **Newly recorded weeds.** Agric. Gaz. New South Wales 32: 580. 1921.—*Amaranthus deflexus* and *Xanthium commune* are reported as new to the Commonwealth.—*L. R. Waldron.*

902. MATHIEU, E. H. **An experiment with Sorghum vulgare, the Great Millet or Juar, from the Bombay Presidency.** Gardens' Bull. Straits Settlements 2: 423–426. *1 pl.* 1921.—A race of *Sorghum vulgare* from the Tapti valley in western India was found to grow and produce grain freely in Singapore, while another from Ahmednagar, also in western India, ran to leaf. The former strangely enough gave the largest yields after transplanting.—*I. H. Burkill.*

903. MATHIEU, E. [H.] **Roselle fibre.** Agric. Bull. Federated Malay States 8: 231–241. 1920 [1921].—The cultivation and fiber-value of *Hibiscus sabdariffa* var. *altissima* are discussed.—*I. H. Burkill.*

904. MILLTON, E. B. **Sorrel in turnip on light land.** New Zealand Jour. Agric. 21: 252-253. 1920.—Sheep will eat the sorrel but will not injure the turnips if care is taken not to overstock and to withhold the animals when the turnips first appear. These results are based on several years experience.—*N. J. Giddings.*

905. MORSE, STANLEY F. **Sour clover and cane.** Facts about Sugar 13: 150. 1921.—An enumeration is presented of the increased yields of sugar cane obtained in Louisiana by planting sour clover (*Melilotus indica*) on the rows as a winter cover crop.—*C. W. Edgerton.*

906. MORSE, W. J. **La industria del "soy bean" en los Estados Unidos. [The soy bean in the United States.]** Rev. Agric. Com. y Trab. [Cuba] 4: 521-524. 1921.—[Translated from the Yearbook of the U. S. Department of Agriculture, 1917.]

907. PIPER, C. V. **Plants and plant culture.** Science 53: 269-279. 1921.—Address delivered in the joint program of the American Society of Agronomy, Botanical Society of America, and American Phytopathological Society, Chicago, Dec. 30, 1920, is here printed.—*C. J. Lyon.*

908. RAHMAN ABDUL. **Padi cultivation in Pahang.** Agric. Bull. Federated Malay States 8: 176-178. 1920 [1921].—The method of growing rice in the state of Pahang, Malay Peninsula.—*I. H. Burkill.*

909. ROBISON, W. L. **Forages for swine.** Monthly Bull. Ohio Agric. Exp. Sta. 6: 46-50. 1921.—The value is given of field peas and oats, field peas and rape, also other forages,—sweet clover, soy bean, and red clover,—with rape pasture, compared with rape alone.—*R. C. Thomas.*

910. ROEMER, T. **Steigerung der Wiesenerträge durch Auswahl des Saatgutes. [Increasing the yield from meadows by seed selection.]** Mitteil. Deutsch. Landw. Ges. 36: Flugbl. 59. *4 p.* [April 9.] 1921.—The author reports on a 4-year trial of orchard grass and timothy seed from different sources. Orchard grass seed from Holland gave the largest total yield; that from America nearly the same. Attention is called to the morphological and other differences between these lots,—plants from Australian seed being dwarf and better adapted to pasture mixtures, while those from American and Holland seed were tall.—Timothy seed of Finnish origin and that from Galicia gave the best results; the American, the poorest. Some selection work was done with timothy and with *Festuca pratensis*; the author illustrates the possibilities of this work by giving a table showing the 3-year yields from individual plants.—*A. J. Pieters.*

911. ROEMER, T. **Steigerung der Wiesenerträge durch Auswahl des Saatgutes. [Increasing the yield from meadows by seed selection.]** Illus. Landw. Zeitg. 41: 1-2. 1921.—[See preceding entry.]

912. STOA, THEODORE E. **Varietal trials with spring wheat in North Dakota.** North Dakota Agric. Exp. Sta. Bull. 149. *55 p., 4 fig.* 1921.—Results of varietal trials are reported for 7 stations in North Dakota: Fargo, Edgeley, Dickinson, Hettinger, Langdon, Williston, and Mandan. Precipitation and temperature data are given for the different stations. At the Fargo station yields given for a few varieties begin with 1892; most yields given begin with 1901. Stem rust and drought have greatly influenced yields. Marquis has proved distinctly superior to other varieties of common wheat in the eastern and southern portions, and somewhat superior in the central and southwestern sections; in the northwestern section, Marquis has been outyielded by Power. The larger yields of Marquis were due partly, if not wholly, to its greater earliness, thus escaping in part rust epidemics and effects of hot weather. Bread produced from Marquis flour is superior to that produced from other varieties commercially available. The data do not indicate that any exploited new varieties, such as Kitchener, Ruby, and Red Bobs, can replace Marquis in North Dakota. The new variety,

Kota, a common wheat, has proved strongly rust resistant, is evidently resistant to drought, has yielded well, and has proved to be a first class milling and baking wheat.—Durum wheats generally have outyielded common wheats. They are more vigorous growers and generally more resistant to drought and rust. Durum wheat flour is lacking in strength of gluten. Of the Durum varieties, Kubanka is superior to Arnautka. Monad and Acme, 2 new varieties strongly resistant to stem rust, have decidedly outyielded Kubanka. The red Durum, D-5, is strongly resistant to stem rust but is decidedly inferior in milling and baking value and for the manufacture of edible pastes.—*L. R. Waldron.*

913. THATCHER, L. E. **Rate of seeding as affecting yields of wheat.** Monthly Bull. Ohio Agric. Exp. Sta. 6: 111–115. 1921.—The author gives a report of yields from various sections of the state where seedings were made at rates varying from 3 to 10 pecks per acre. Using these as a basis, brief discussions are given of the relation of rates of seeding to richness of soil and to tillering.—*R. C. Thomas.*

914. THORNE, C. E. **Fertilizing the corn crop.** Monthly Bull. Ohio Agric. Exp. Sta. 6: 35–37. 1921.—Records of increases in yield of corn in a 5-year rotation of corn, oats, wheat, clover, and timothy show that where acid phosphate and other fertilizers are used, a period is reached in which something besides commercial fertilizers is needed. The cheapest and most effective commercial carriers of nitrogen and potassium are nitrate of soda and muriate of potash. Moreover, barnyard manure, reinforced with acid phosphate at the rate of 40 pounds per ton of manure and spread upon the land during the winter at the rate of 8 tons per acre, has given in a 3-year rotation of corn, wheat, and clover an average annual income of $16.71 against $10.39 per annum for the most effective chemical fertilizer.—*R. C. Thomas.*

915. THORNE, C. E. **Fertilizing the wheat crop.** Monthly Bull. Ohio Agric. Exp. Sta. 6: 99–107. 1921.—The article includes a discussion of the following important factors in economy in wheat production: Adjustment of rotation, early and thorough preparation of seed bed, selection of variety, liberal use of seed, and liberal fertilizing.—*R. C. Thomas.*

916. THORNE, C. E. **Thirty-ninth annual report.** Ohio Agric. Exp. Sta. Bull. 346. *vii-xxxx.* 1921.—The report includes a discussion of the following experiments: (1) Phosphorus combinations and availability in soils; (2) relation of soil supply of phosphorus and nitrogen to the protein and carbohydrates of wheat; (3) sulphur requirements of crops; (4) physiology of nitrification; (5) *Azotobacter* studies; (6) increase and fixation of desirable qualities in cereals; (7) study of variation in pure lines of winter wheat; (8) sulphofication in relation to ammonification and nitrification; (9) factors relating to the lodging of the small grains; (10) procedure for measuring possible changes in soil potassium produced by treatment and cropping.—*R. C. Thomas.*

917. VOLKART, A., A. GRISCH, UND W. BANDI. **Zweiundvierzigster Jahresbericht der Samenuntersuchungs- und Versuchsanstalt Oerlikon-Zürich. [Forty-second annual report of the seed testing station at Oerlikon, Zurich.]** Landw. Jahrb. Schweiz 35: 67–89. *1 fig.* 1921.—A report of the seed-testing work for the year 1918–19 is presented, together with a summarized statement of the results of seed tests from 1876 to 1919. Information is also given regarding field tests with cereal and forage crops and the control of plant diseases.—*J. D. Luckett.*

918. WALDRON, L. R. **Winter wheat in North Dakota.** North Dakota Agric. Exp. Sta. Bull. 151. *8 p.* 1921.—The bulletin summarizes experiments with winter wheat conducted at 5 stations and upon several demonstration farms in North Dakota. Results have been almost uniformly negative although winter wheat has shown somewhat greater success at Dickinson and Williston, in the western portion of the state, than at Fargo, Langdon, or Edgeley, in the eastern portion. It will be necessary to secure hardier varieties if winter wheat is to be grown in North Dakota on a commercial scale.—*L. R. Waldron.*

919. WENHOLZ, H. **Nomenclature of maize varieties.** Agric. Gaz. New South Wales 32: 536. 1921.—The names Fitzroy and Wellingrove are applied to 2 established yellow dent varieties. Ulmarra White Cap, Large Red Hogan, and Manning Silvermine are applied to 3 varieties essentially new. Brief notes are given.—*L. R. Waldron.*

BIBLIOGRAPHY, BIOGRAPHY AND HISTORY

NEIL E. STEVENS, *Editor*

(See also in this issue Entries 873, 943, 988, 1014, 1025, 1142, 1145, 1219, 1220, 1221, 1222, 1255, 1390)

920. ANONYMOUS. **E. H. Wilson.** Florists' Exchange 50: 233. *Fig. 1.* 1920.—Mention is made of the departure of E. H. Wilson, assistant director of the Arnold Arboretum, Jamaica Plain, Massachusetts, for a 2-years' trip around the world to establish closer connections with the leading horticultural and botanical institutions.—*Lua A. Minns.*

921. ANONYMOUS. **John Macoun memorial.** Canadian Field Nat. 34: 176. 1920—A memorial in the form of a painted portrait costing about $700 is to be hung in the Victoria Memorial Museum.—*W. H. Emig.*

922. ANONYMOUS. **Summer field meeting of cereal pathologists.** Phytopathology 11: 177. 1921.—The plans and itinerary are announced for the summer meeting of cereal pathologists at University Farm, St. Paul, Minnesota, July 19–22, 1921.—*B. B. Higgins.*

923. BABCOCK, E. B. **Gregor Mendel and the support of scientific work at Brünn.** Science 54: 275–276. 1921.—This note includes a portion of a letter from Dr. HUGO ILTIS at Brünn in which he announces the decision to sell the original manuscript of Mendel's Versuche über Pflanzenhybriden.—*C. J. Lyon.*

924. CAMPBELL, D. H. **Professor H. Bruchmann.** Science 54: 67–68. 1921.—Bruchmann made remarkable studies on the life history of *Lycopodium*. He was born Nov. 13, 1847, and died Christmas day, 1920.—*C. J. Lyon.*

925. FORTÚN, G. M. **Notas sobre una excursión a "El Retiro."** [**Notes on an excursion to "El Retiro."**] Rev. Agric. Com. y Trab. [Cuba] 3: 410–413. *2 fig.* 1920.—A description is given of the ruins of the botanical garden of the late Cuban botanist José Blain, with mention of some trees growing there.—*F. M. Blodgett.*

926. GOTHAN, W. **J. T. Sterzel.** Zeitschr. Deutsch. Geol. Ges. **72**: 138–140. 1920.—A brief account is given of this paleobotanist who died in 1914.—*E. W. Berry.*

927. GUPTA, S. N. **The medicine and pharmacy of ancient India.** Pacific Pharm. 13: 64–70, 92–97. 1919.—The early history of India shows that the history of medicine is closely bound up with the social and religious customs of the people. Indian medical history is divided into 3 periods: Vedic, Brahmanic, and Arabian. Vedic, the earliest, is reflected in the 4 Vedas, and from the Rig-Veda and Atharva-Veda our knowledge of the theory and practice of Hindu medicine is derived. There was a materia medica limited to vegetable substances. In the later Vedic age there was separated from the priests a body of physicians who were at the same time apothecaries. In the Brahmanic period the Hindu system of medicine had become methodized, and arranged on a rational basis, with a scientific terminology. At least 6 standard works existed, and probably 2000 years later 2 names are pre-eminent, Charaka and Susruta, the former dealing with physiology and pathology, Susruta mostly with surgery. For 2000 years these books have been paid all the honors of a state recognized pharmacopoea. About 500 plants were named in Charaka, and 760 in Susruta. Physicians were required to study plants, and know where, when, and under what conditions to collect, dry, and preserve them. Toxicology was well developed, and the rajahs, as a means of self-protection, passed laws requiring that a newly discovered poison should not be made known until an antidote had been found.—*C. M. Sterling.*

928. HARSHBERGER, J. W. **The old gardens of Pennsylvania. III-X.** Garden Mag. 32: 257–258, 326–328; 33: 44–46, 120–123, 195–196, 255–256, 326–329, 374–377. *Illus.* 1921.—The following places which are specially interesting for their old or rare trees are described, with

their history, and with notes and illustrations of many individual specimens: (3) Painter's arboretum, near Lima, Delaware county, a farm settled by Jacob Minshall in 1701, planted in trees from about 1825 by the brothers Minshall and Jacob Painter; (4) Peirce arboretum at Longwood, Chester county, where planting was begun about 1800 by Joshua and Samuel Peirce, on a tract patented by George Peirce or Pearce in 1700 or 1701; (5) Fairmount park in Philadelphia, which includes several historic places, among them the Lemon Hill estate of Robert Morris, and Belmont, the home of Judge Peters, where trees were planted by both Washington and Lafayette when guests; the black walnut planted by the latter is still standing, and there are many choice trees on Lansdowne Plateau, where the Michaux grove, which was to contain 2 specimens of every oak suited to the climate, was started in 1825 with money left by François André Michaux to the American Philosophical Society; (6) Woodlands Cemetery in Philadelphia, formerly the estate of William Hamilton, who had a fine collection of trees and shrubs as early as 1785; when Frederick Pursh was gardener there in 1802–1805, it was exceedingly rich in American species, with an immense collection of exotics, of which there remain 2 Ginkgos planted in 1785, probably the first in this country; (7) John Evans' arboretum in Radnor township, Delaware county, begun somewhat after 1828, when Evans first became interested in botany; he obtained rare and interesting plants by exchange from all over the world, and made several journeys in search of additions to his collection; (8) Awbury arboretum in Germantown, a plantation of trees begun about 60 years ago by Thomas P. Cope, and recently endowed as a public park by members of the Cope family; (9) Aldie, near Doylestown, where flower gardens and arboretum were begun about 1870 by the present owner's father, William Robert Mercer, Sr.; (10) Compton, near Philadelphia, less notable for age than for successful introduction of a great number of new Chinese and Japanese shrubs and plants, as well as those native to this country.—*H. C. Thompson.*

929. LINTON, A. W. **Pharmacy and medicine of George Eliot.** Western Druggist 43: 78–80. 1921.—George Eliot was most thorough and painstaking in portraying her characters and spent an enormous amount of time in reading medical literature in preparation for her work, as is shown by several examples. The bitter rivalry between physicians and surgeons in Florence in the 15th century is illustrated by the conversation between the doctor and Nello the barber in Romola. The character of Dr. Lydgate in Middlemarch shows that she spared no pains to secure accuracy in every reference to professional matters, and was really in advance of her time. Sir James Paget declared that the insight of the author into medical life was so deep and accurate that he could hardly believe there was no biographical foundation for this character.—*C. M. Sterling.*

930. LYMAN, G. R. **Report of the twelfth annual meeting of the American Phytopathological Society.** Phytopathology 11: 194–201. 1921.—The report contains the history of the meeting, together with the reports of the treasurer, of the business manager of Phytopathology, of the Advisory Board, of the committee on the Phytopathological Institute, of the committee on resolutions, and of the council.—*B. B. Higgins.*

931. MANGIN, LOUIS. **Emile Boudier (1828–1920).** Bull. Trimest. Soc. Mycol. France 36: 181–188. *Portrait.* 1920.—A short biographical sketch of the great mycologist is given, followed by a list of his works, numbering 97.—*D. S. Welch.*

932. MATTIROLO, ORESTE. **Commemorazione del Corrisp. P. A. Saccardo.** [Commemoration of P. A. Saccardo.] Atti R. Accad. Lincei Roma Rendiconti (Cl. Sci. Fis. Mat. e Nat.) 30^1: 149–160. 1921.—An appreciation of the life and work of P. A. Saccardo is presented.—*F. M. Blodgett.*

933. MORSE, W. J. **A new Canadian agricultural journal.** Science 53: 182–183. 1921.—Scientific Agriculture and La Revue Agronomique Canadienne, the official organ of the Canadian Society of Technical Agriculturists, is published monthly by the Industrial and Educational Publishing Co., Ltd., Gardenvale, Quebec. The 1st issue was dated Jan. 1, 1921. Articles are printed in both English and French.—*C. J. Lyon.*

934. OSTERHOUT, W. J. V., ROLAND THAXTER, AND M. L. FERNALD. **Lincoln Ware Riddle.** Science 54: 9. 1921.—This is a minute on the life and services of Dr. Riddle taken from the records of the Faculty of Arts and Sciences of Harvard University.—*C. J. Lyon.*

935. PIROTTA, ROMUALDO. **Commemorazione dell 'Accademico Prof. G. Cuboni.** [**Commemoration of Professor G. Cuboni.**] Atti R. Accad. Lincei Roma Rendiconti (Cl. Sci. Fis. Mat. e Nat.) 30[1]: 182–187. 1921.

936. TRAVERSO, G. B. **Pier Andrea Saccardo.** Nuovo Gior. Bot. Ital. 27: 39–74. 1920 [1921].—An account is presented of the life and work of Saccardo (1845–1920), with a chronological list of his publications (p. 58–74) by his son, DOMENICO SACCARDO.—*Ernst Artschwager.*

937. WISTER, J. C. **What America has done for the Iris.** Gard. Mag. 33: 234–239. *13 fig.* 1921.—A brief history is given of the cultivation of Iris in America with mention of persons who have been instrumental in the development of Iris growing.—*H. C. Thompson.*

BOTANICAL EDUCATION

C. STUART GAGER, *Editor*

ALFRED GUNDERSEN, *Assistant Editor*

(See also in this issue Entries 907, 1030, 1141, 1147, 1188, 1325)

938. ANONYMOUS. **A botanical garden for the Pacific Coast.** Florists' Exchange 49: xvi. 1920.—The writer quotes and summarizes 2 letters describing La Quinta Ranch, at Sawtelle, near Santa Monica, California. The owner, Mr. Danziger, is desirous of so developing it that it shall be to the Pacific Coast what the Arnold Arboretum is to the Atlantic Coast. The estate consists of 1300 acres,—mountains and valleys, hills, and canyons, with winding drives that terminate at a height giving a view of Los Angeles, the Pacific, the Catalina Islands, and Mt. Baldy. The development has been under way for about 5 years under the supervision of Mr. P. D. Barnhart. The primary object will be to educate home-makers of this region in a knowledge of drouth-resistant exotics from similar climates. Vegetation will be gathered from all parts of the world and tried out in a small way.—*Lua A. Minns.*

939. ANONYMOUS. **Educational forestry.** Science 54: 148–149. 1921.—Efforts to give some instruction to visitors are being made at the Alleghany State Park. "The Buffalo Academy of Science is coöperating with the New York State College of Forestry in this work." —*C. J. Lyon.*

940. ANONYMOUS. **School children's maize growing competition at Yanco.** Agric. Gaz. New South Wales 32: 574. 1921.

941. BOWMAN, H. H. M. [Rev. of: YOUNGKEN, H. W. **Pharmaceutical botany.** *3rd ed., xix + 479 p., 238 illus., and glossary.* P. Blakiston's Son & Co.: Philadelphia, 1921.] Science 53: 189–190. 1921.

942. CHAUVIN, E. **A propos de récents empoisonnements par les champignons.** [**A propos of recent cases of mushroom-poisoning.**] Bull. Trimest. Soc. Mycol. France 36: 212–214. 1920. —Remarking upon 2 recently reported cases of fatal mushroom-poisoning, the author suggests methods for instructing the public in the identification of dangerous forms.—*D. S. Welch.*

943. GLEASON, H. A. **The botanical gardens of New York.** Sci. Amer. Monthly 3: 24–26. *11 fig.* 1921.

944. HAYES, HERBERT KENDALL, AND RALPH JOHN GARBER. **Breeding crop plants.** *xvii + 328 p., 66 fig.* McGraw Hill Book Co.: New York, 1921.—The 19 chapter headings are: Introduction (historical and fundamental), plant genetics, mode of reproduction in relation to breeding, field plot technic, controlling pollination, classification and inheritance in wheat, classification and inheritance for small grains other than wheat, methods of breeding small

grains, some results of selection with self-fertilized crops, some results of crossing as a means of improving self-fertilized crops; cowpeas, soy beans and velvet beans; flax and tobacco, cotton and sorghum, maize breeding; grasses, clover and alfalfa; potato improvement, breeding of vegetables, fruit breeding, farmers' methods of producing pure seeds. Five pages are devoted to definitions of technical terms, and 20 to literature citations.—*C. S. Gager.*

945. KENOYER, L. A. **Materials for nature study in India.** Indian Education 19: 441–444. 1921.—India has advantages over western countries (1) in richer variety of forest, field, and garden plants, (2) in better range of material throughout the year, (3) possibility of carrying on gardening during any or all the time that schools are in session. The monsoon season is the best, because at that time material is most abundant. Plants spring up in great numbers, dozens of species being discoverable in regions that, at other times, appear barren wastes. The school garden is recommended as a source of material for nature study. The pupils should learn that they do not need to depend on a *mali* to make plants grow. The author urges the founding in the hills or on the seashore of one or more summer laboratories for teachers and others. Most of the "botanies of the west" are unsuited to Indian schools because they treat of winter-deciduous trees, rings of growth, scaly buds, fleshy-rooted biennials as if they were typical, instead of specialized forms for enduring a special set of conditions.—*C. S. Gager.*

946. SCHWAPPACH, A., [and others]. **Neudammer Förster-Lehrbuch. [Neudamm forester's text-book.]** *6th ed., 940 p.* Neudamm, 1919.—A vast amount of information is grouped under the major headings: Botany, zoology, ecology, forest mensuration, silviculture, forest utilization, forest protection, forest organization, and hunting and fishing. The book is especially useful to forestry students.—*Richard H. D. Boerker.*

CYTOLOGY

GILBERT M. SMITH, *Editor*
GEORGE S. BRYAN, *Assistant Editor*

(See also in this issue Entries 1072, 1074, 1084, 1095, 1247)

947. GUILLIERMOND, A. **Nouvelles observations sur l'origine des plastides dans les phanérogames. [New observations on the origin of plastids in phanerogams.]** Rev. Gén. Bot. 33: 401–419, 449–470. *Pl. 54–66, fig. 1–8.* 1921.—The author describes the origin of leucoplasts (amyloplastids) from their primordia in the tips of the roots of the gourd, *Ricinus*, bean, pea, *Zea Mays*, the bud of *Elodea canadensis*, the parts of the flower of *Iris germanica* and of *Tulipa suaveolens*. The term "condriome" is used as a general expression for all the granules, short rods, and longer slender rods in the cytoplasm that are usually known as mitochondria, chondrioconts, and chondriosomes. His description of the origin of leucoplasts from the primordia agrees in all essentials with that of other investigators who have traced the origin of plastids from their primordia. In all the objects studied Guilliermond acknowledges the fact already established by Rudolph, Saherer, Sapihin, and Mottier, namely, that besides the primordia of plastids in the cell, other similar granules and rods are present which do not become plastids. In the flower of the yellow varieties of *Tulipa suaveolens* the pigment, xanthophyll, is elaborated by mitochondria-like plastids. It is claimed that the chondriome content of the tissues above mentioned is similar to that of the cells in animals and in fungi.—*D. M. Mottier.*

ECOLOGY AND PLANT GEOGRAPHY

HENRY C. COWLES, *Editor*
GEORGE D. FULLER, *Assistant Editor*

(See also in this issue Entries 883, 901, 1194, 1198, 1200, 1202, 1227, 1249, 1352, 1385, 1415 1417, 1428)

GENERAL, FACTORS, MEASUREMENTS

948. ALLEN, WINFRED EMORY. **A quantitative and statistical study of the plankton of the San Joaquin River and its tributaries in and near Stockton, California, in 1893.** Univ. California

Publ. Zool. 22: 1–292. *Pl. 1–12, 1 fig.* 1920.—The present paper is an exhaustive study, including both the algae and the zooplankton, of the volumetric data, the times and conditions of occurrence, as well as the relation to various physical and physiographic features of the region surrounding the locality investigated. There is a very full presentation of data assembled during the investigation. The conclusions are as follows: (1) San Joaquin waters are capable of supporting abundant plankton, and they do so in the vicinity of Stockton; (2) the plankton of the sewage-laden Stockton Channel is distinctly different from that of the river, the number and volume of its animal forms being especially conspicuous as distinguished from the algal dominants of the latter; (3) temperature is, within certain limits, the determining factor in seasonal distribution. This may be by direct retardation of growth and reproduction in organisms, or by direct influence through food supply and gaseous content of the water; (4) water currents above a moderate speed are distinctly inimical to plankton development; (5) the peculiar succession of rainy season and dry season has resulted in an autumnal maximum of plankton about Stockton, a condition directly contrary to that of vernal maxima recorded by other observers in other localities; (6) collections taken at intervals of 1 week or more do not furnish a basis for accurate determination of plankton distribution through the year. Daily collections properly taken would probably do so; (7) there is some evidence in favor of the idea that increase of lunar light tends to increase of plankton, especially chlorophyll bearers; (8) there is evidence to show that fluctuations in amount of plankton occur at various hours of the day; (9) the abundant occurrence of *Bacillaria paradoxa*, generally listed as a typical brackish water form, is notable. This seems to be one case in which marked departure from a typical chemical environment has not visibly affected structure or behavior. The paper contains lists and notes on the species of the Bacteriaceae, Chlorophyceae, and chlorophyll-containing flagellates collected and studied.—*W. A. Setchell.*

949. Alps, H. F., and O. H. Hammonds. **Layer measurements of snow on ground near Summit, California.** Monthly Weather Rev. 48: 519–520. 1920.

950. Astre, Gaston. **Sur la biologie des mollusques dans les dunes maritimes françaises et ses rapports avec la géographie botanique. [On the biology of the molluscs of the maritime dunes of France and its relation to plant geography.]** Compt. Rend. Acad. Sci. Paris 171: 678–680. 1920.

951. Cannon, W. A. **Some characteristics of precipitation in arid regions.** [Abstract.] Ecology 1: 63. 1920.

952. Douglass, A. E. **Evidence of climatic effects in the annual rings of trees.** Ecology 1: 24–32. *10 fig.* 1920.—An attempt is made to correlate climatic effects with the size of tree rings. The main comparisons are made with rainfall during the last 50 years. By means of a periodograph, the ring variations of Sequoias and yellow pines over large areas have been analyzed and found to have numerous corresponding periods or cycles of variability. Further analysis will be based upon a study of mean sensitivity, the difference between each 2 successive rings divided by their mean. This criterion is to be used in selecting materials for a study of past climates as integrated in the growth of tree rings.—*Charles A. Shull.*

953. Ferdinandsen, C. **Danske Ukrudtsformationer. [Danish formations of weeds.]** Nordisk Jordbrugsforskning [København] 1920: 49–67. 1920.—The present article is the author's abstract of his studies on the relations of weeds on cultivated mineral soils. Combining the statistical methods of Raunkiaer and the microbiological soil-testing methods of Christensen, the author details the weed spectra on alkaline and acid soils and gives lists of acidophile, acidokline, amphokline, basokline, and basophile species. It is shown that when cultivated ground is laid out as permanent grass the therophytes gradually are replaced by hemikryptophytes and chamaephytes.—*Ernst Gram.*

954. Ferdinandsen, C. **Traek af Skovbundssvampenes Biologi. [Fungi on forest ground.]** Meddel. Foren. Svampekundsk. Fremme [København] 1920: 69–82. *Fig. 1–2.* 1920.—

An account is given of the influence of moisture and light; also of growing habits and spore dissemination, with a list of species in the different localities.—*Ernst Gram.*

955. GRIGGS, R. F. **Scientific results of the Katmai Expeditions of the National Geographic Society. I-X.** Ohio State Univ. Bull. 24^{15}: 1–492. *186 fig.* 1920.—This is a collection of reprints from the Ohio Journal of Science. Among the papers included the following by the author are of botanical interest: The Recovery of Vegetation at Kodiak, Are the Ten Thousand Smokes real Volcanoes, The Character of the Eruption Indicated by its Effects on Nearby Vegetation, and The Beginnings of Revegetation in Katmai Valley.—*E. N. Transeau.*

956. KELLERMAN, KARL F. **The effects of salts of boron upon the distribution of desert vegetation.** Jour. Washington [D.C.] Acad. Sci. 10: 481–486. 1920.—The distribution of boron compounds in the water and soil of the Pacific Coast is discussed, and the suggestion made that there may be a very close relationship between the presence of these substances and the desert character of certain areas.—*Helen M. Gilkey.*

957. LESAGE, PIERRE. **Évaporomètres et mouvement des fluides au travers des membranes. [Evaporimeters and the movement of liquids through membranes.]** Compt. Rend. Acad. Sci. Paris 171: 927–930. 1920.—The author discusses the physical principles involved in the operation of evaporimeters and their relation to the movement of liquids through membranes. —*C. H. Farr.*

958. MOORE, BARRINGTON. **The scope of ecology.** Ecology 1: 3–5. 1920.—In this, the presidential address, delivered before the St. Louis meeting of the Ecological Society of America, 1919, the synthetic nature of the present problems in ecology is emphasized.—*Charles A. Shull.*

959. POWERS, EDWIN B. **The variation of the condition of seawater, especially the hydrogen-ion concentration, and its relation to marine organisms.** Publ. Puget Sound Biol. Sta. 2: 369–385. *Pl. 64.* 1920.—The work was done primarily with animals, but affects botany directly in the plankton and indirectly in general principles. It is suggested that the compatibility of the habitat depends more upon the per cent of hydrogen than upon any other water factor. Fixed forms must withstand a greater range of P_H than plankton or motile forms.—*T. C. Frye.*

960. SHREVE, EDITH B. **Seasonal changes in the water relations of desert plants.** [Abstract.] Ecology 1: 64. 1920.

961. VARNEY, B. M. **Monthly variations of the precipitation-altitude relation in the central Sierra Nevada of California.** Monthly Weather Rev. 48: 648. *2 fig.* 1920.—Study of the precipitation data for a series of stations across the central Sierra Nevada of California indicates that the rate of increase of precipitation with altitude varies throughout the year in a well-defined progression from smallest rate in summer to greatest in winter. Similarly, the rates of decrease in the zone above the level of maximum precipitation, and in the zone from the summit down the leeward slope are smallest in midsummer and greatest in midwinter.—It is suggested that the observed seasonal variations are probably the result of seasonal differences in the relative humidity of the air currents involved, and that, if this be true, well marked seasonal variations in the precipitation-altitude relation may be a general characteristic of regions having pronounced wet and dry seasons.—*Author's abstract.*

962. VARNEY, B. M. **Some further uses of the climograph.** Monthly Weather Rev. 48: 495–497. *Fig. 5.* 1920.

963. WEAVER, J. E., AND A. MOGENSEN. **Relative transpiration of coniferous and broad-leaved trees in autumn and winter.** Bot. Gaz. 68: 393–424. *18 fig.* 1919.—A series of greenhouse and field experiments, with results, are presented in tabulations and discussions. Based on the daily average water loss per unit area of leaf surface, the species rank as follows: *Abies*

grandis 5.44, *Quercus macrocarpa* 5.18, *Pinus Banksiana* 4.80, *Pinus ponderosa* 4.20, *Picea Engelmanni* 4.18, *Ulmus americana* 3.56, *Acer saccharinum* 2.66. Contrary to statements commonly current, autumn transpiration losses in conifers are as great as, or greater than, those from broad-leaved trees, and the decrease in water loss from broad-leaved trees due to defoliation is paralleled by a similar decrease in conifers; winter losses from conifers are only $\frac{1}{18}-\frac{1}{151}$ as great as those in the autumn. Increased losses of broad-leaved trees in spring are in proportion to the leaf areas exposed and are closely controlled by weather conditions; conifers also show similar increased losses.—*H. C. Cowles.*

964. Weiss, H. B. **Coleoptera associated with Pleurotus ostreatus.** Entomol. News 31: 296–297. 1920.—This species seems more attractive than any other of the Agaricaceae. Twenty-six species of beetles are listed. Only a few species were found on *Pleurotus sapitus.* Staphylinidae (rove-beetles) are commoner on gill fungi than on polypores.—*O. A. Stevens.*

965. Weiss, H. B. **The insect enemies of polyporoid fungi.** Amer. Nat. 54: 443–447. 1920—A general plea is made that the species of fungi on which insects are collected be noted. The author calls attention to insect groups associated with polypores in New Jersey, 80 per cent of the species being infested by 59 species of Coleoptera, 5 of Hymenoptera (parasitic on Coleoptera), 6 of Diptera, 3 of Lepidoptera, and 1 of Hemiptera. Certain polypores seem more attractive to insects than others, the favorite being *Polyporus versicolor.*—*J. P. Kelly.*

966. Wherry, Edgar T. **Correlation between vegetation and soil acidity in southern New Jersey.** Proc. Acad. Nat. Sci. Philadelphia 72: 113–119. 1920.—The factors determining the character of the flora of the New Jersey Pinebarrens are held to be soil acidity and low salt content.—*L. B. Walker.*

967. Wherry, Edgar T. **Observations on the soil acidity of Ericaceae and associated plants in the Middle Atlantic States.** Proc. Acad. Nat. Sci. Philadelphia 72: 84–111. 1920.—Tests of soils in the native habitats of 42 species of Ericaceae show very definite acid relationships. The optimum acid, frequently-observed acid, and occasional acid values of soils are given for each species. A similar table gives comparable results for the Orchidaceae.—*L. B. Walker.*

968. Wherry, Edgar T. **Plant distribution around salt marshes in relation to soil acidity.** Ecology 1: 42–48. 1920.—Evidence is presented to show that soil acidity is closely related to the distribution of native plants. The transition from low alkalinity in salt marches to high acidity of soil surrounding these marches is sharp, the change occurring within the space of a few centimeters. The acidity of soils around such marshes is explained on the basis of adsorption of basic ions by clay and humus with liberation of acid, mainly hydrochloric and sulphuric. Lists of species are given occurring on circumneutral and acidic soils in New Jersey and at Oak Island near Boston.—*Charles A. Shull.*

969. Winters, S. R. **Measuring evaporation.** Sci. Amer. 124: 13. *1 fig.* 1921.—A brief description is given of an evaporimeter used by the U. S. Forest Service.—*Chas. H. Otis.*

VEGETATION

970. Bolton, Edith. **Plant life in Cheddar caves.** Nature 106: 180. 1920.—The author reports the identity of plants previously reported (Nature 105: 709. 1920). These are: *Plagiothecium denticulatum, Amblystegium serpens,* and *Fissidens bryoides*; also a unicellular green alga, and a few fern prothallia. The spores were probably introduced on spades or on clothes of workmen, as previously suggested.—*O. A. Stevens.*

971. Cowles, H. C. **The rising rock shores of northern Lake Michigan.** [Abstract.] Ecology 1: 63. 1920.

972. FRYE, T. C. **Plant migration along a partly drained lake.** Publ. Puget Sound Biol. Sta. 2: 393–397. 1920.—Shore plants migrate with the water level or perish when the level falls permanently. Erosion is a factor in keeping some submerged plants below a certain depth. It is doubtful whether floating seeds are a factor in determining shore plants, because the power to float is very general among plants not especially water-loving. The seeds of some thistles may roll on smooth water like tumble-weeds on a prairie.—*T. C. Frye.*

973. FULLER, GEORGE D. **An edaphic limit to forests in the prairie region of Illinois.** [Abstract.] Ecology 1: 64. 1920.

974. HOFMANN, J. V. **The establishment of a Douglas fir forest.** Ecology 1: 49–53, 63. *1 fig.* 1920.—Production of heavy crops of seed, which are cached by rodents, retention of viability for long periods and through forest fires after burial, quick germination under favorable conditions, and rapid development of a long radix are the main factors leading to the establishment of Douglas fir as a stage in the forest development of the Cascade and Coast ranges. Its inability to endure shade eliminates it from the climax forest of the region.—*Charles A. Shull.*

975. JASSOY, A. **Die Pflanzenformationen der österreichischen Küstenländer in Lichtbildern. [The plant formations of the Austrian coast provinces.]** Ber. Senckenberg. Naturf. Ges. Frankfurt a. M. 47: 80–81. 1919.—A brief résumé is here given of an illustrated lecture on the vegetation of the countries bordering the Adriatic Sea. The presence of 2 rare and peculiar conifers, *Picea Omorica* and *Pinus Peuce*, is especially emphasized.—*A. W. Evans.*

976. NICHOLS, GEORGE E. **The vegetation of Connecticut. VII. The associations of depositing areas along the seacost.** Bull. Torrey Bot. Club 47: 511–548. *Fig. 1–10.* 1920.—Such areas are divided into 3 groups: (1) Stony bottoms and beaches, (2) sandy bottoms, beaches, and dunes, (3) muddy bottoms and shores and coastal swamps. In the 1st group are discussed the associations of the sublittoral, littoral, and supralittoral regions, including those of the shingle beaches. Under the 2nd are treated those of the same 3 regions, with a discussion of successional relations. Under the 3rd are discussed: (a) The associations of the salt marsh series, including muddy bottoms of sublittoral tidal flats, of lower littoral, the midlittoral marsh, and upper littoral marsh, and supralittoral region; also muddy beaches; (b) associations of brackish marsh series, with a somewhat similar series of divisions; and (c) associations of the fresh marsh series. Successional relations along depositing muddy shores are also treated.—*P. A. Munz.*

977. SETCHELL, W. A. **Stenothermy and zone-invasion.** Amer. Nat. 54: 385–397. 1920.—From the standpoint of distribution and effective reproduction, the author considers that stenothermy is the rule in marine plants. Stenothermy implies persistence normally between narrow temperature limits. The author recalls his previous division of surface waters of the ocean into zones according to courses of 10, 15, 20, and 25°C. isotheres and the fact that the majority of species are confined to one or another of these zones. Certain apparently exceptional (eurythermal) species are taken up, such as *Zostera marina*, which has effective methods of vegetative reproduction and dispersal, and *Ascophyllum nodosum* of the upper boreal zone, which appears as far south as New Jersey because there is sufficient seasonal duration below 10°C. for reproduction.—*James P. Kelly.*

978. SHULL, C. A. **The formation of a new island in the Mississippi River.** [Abstract.] Ecology 1: 65. 1920.

FLORISTICS

979. BEWS, J. W. **Some general principles of plant distribution as illustrated by the South African flora.** Ann. Botany 35: 1–36. 1921.—After a somewhat extended general discussion of some of the chief principles in plant distribution, the present-day conditions in South Africa are summarized. The climatic areas are arranged in order of increasing mesophytism

as follows: (1) Western, (2) Central Karroo, (3) Cape, (4) Sand-veld of the Kalahari, (5) Thorn-veld of the East, (6) High-veld and mountains of the East, (7) Coast belt of the East. In all these areas are habitats occupied by widespread species, such as cultivated land, streams, marshes, etc. Evidence is presented with numerous examples in favor of the following conclusions: (1) A widespread species coming in contact with conditions different from those which produced it may give rise to new species suited to the new conditions; (2) the new species in South Africa are usually more mesophytic than the parent but may be more xerophytic; (3) tropical species from the northern zone may give rise to temperate species; (4) one widespread species may give rise to several derived ones or may break up into several; (5) in many cases polygenesis is indicated by the fact that the same derived species may show a widely discontinuous distribution while the parent form is common over all the area. Some evidence is also given that the same conclusions apply to larger groups than species. The question of the origin of the South African flora is discussed and the conclusion is reached that it is probably of northern derivation.—*W. P. Thompson.*

980. Cratty, R. I. **Ranunculus Purshii in Iowa.** Rhodora 22: 183. 1920.—A new station is reported for this species in northern Iowa, thus extending the range several hundred miles southward in the Mississippi Valley.—*James P. Poole.*

981. Davy de Virville, Ad. **Note sur la distribution géographique comparée des Primula officinalis Jacq., Primula grandiflora Lam. et Primula elatior Jacq. dans l'ouest de la France. [On the geographical distribution of P. officinalis, P. grandiflora, and P. elatior in the west of France.]** Compt. Rend. Acad. Sci. Paris 170: 1068–1071. 1920.—The distribution of these 3 species in France is discussed.—*C. H. Farr.*

982. Gorman, M. W. **Flora of Hamilton Mountain, Washington.** Mazama 6: 62–77. 1920.—A list is given of 7 pteridophytes and about 190 spermatophytes, with localities. The mountain, 2,432 feet high, is in Skamania County, Southwestern Washington.—*T. C. Frye.*

983. Kaiser, George B. **Little journeys into mossland. I. Early bryological experiences.** Bryologist 23: 88–90. 1920.—An account is given of a day's botanizing near Philadelphia.—*E. B. Chamberlain.*

984. Long, Bayard. **A further note on Crepis biennis.** Rhodora 22: 192–193. 1920.—The discovery is reported of another authentic specimen of this species in addition to the 3 reported in a previous paper (see Bot. Absts. 4, Entry 347). This specimen, from the herbarium of Dr. Meredith, was collected from the lawn of the State Hospital at Danville, Pennsylvania, June 6, 1889, probably introduced in imported grass seed. The collector reports that it did not occur a 2nd year.—*James P. Poole.*

985. Moore, Barrington, C. C. Adams, T. L. Hankinson, G. P. Burns, and Norman Taylor. **Plants and animals of Mt. Marcy, New York.** [Abstract.] Ecology 1: 61. 1920.

986. Murrill, W. A. **Botanizing at Blacksburg, Virginia.** Jour. New York Bot. Gard. 21: 191–193. 1920.

987. Nelson, J. C. **Crepis setosa in Oregon.** Rhodora 22: 191–192. 1920.—The occurrence is noted of *C. capillaris* and *C. setosa* Haller f. in the Willamette Valley, both as introduced weeds. The absence of *C. biennis* in that region is further confirmed by the author.—*James P. Poole.*

988. Nelson, J. C. **Does Saximontanus mean "Rocky Mountains"?** Rhodora 22: 194–195. 1920.—The author calls attention to the fact that "saximontanus" is properly applied only to the part of the Rocky Mountain system from the Laramie Plains northward (the "Stony Mountains") and not to the southern Park Mountains, "saxa" meaning stone but detached fragments rather than bold cliffs and bare rocks, which would be described as "rupes" or "scopuli." Through general usage, however, the word has become applied to the whole Rocky Mountain system.—*James P. Poole.*

989. NELSON, J. C. **Notes on Scleropoa.** Torreya 20: 119–122. 1920.—*Scleropoa rigida* (L). Griseb., which was collected at Salem, Oregon in May, 1917, has been found each year since and seems to have thoroughly established itself. It has previously been known in the U. S. A. only from stations on, or very near, the coast of the eastern and southern states, with the exception of an accidental waif from South Dakota. The synonymy of the genus is briefly outlined.—*J. C. Nelson.*

990. NICHOLSON, WM. EDW. **Mosses from the Caspian and Black Sea regions.** Bryologist 23: 90–91. 1920.—A list is presented of 21 mosses and 2 hepatics, with notes on distribution.—*E. B. Chamberlain.*

991. OFFNER, JULES. **Remarques phytogéographiques sur les massifs du Vercors et du Dévoluy.** [Remarks on the phytogeography of the massifs of Vercors and Dévoluy.] Compt. Rend. Acad. Sci. Paris 169: 1054–1056. 1919.—A comparison is made of certain features of the plant geography of the alpine floras of the regions.—*V. H. Young.*

992. PARISH, S. B. **The immigrant plants of Southern California.** Bull. Southern California Acad. Sci. 19: 3–30. 1920.—The greater part of the paper is given over to an annotated catalogue of the established introduced species in Southern California; there are 281 species and varieties, 177 genera, and 41 families represented in the list. A bibliography of California immigrant species is given, their introduction being divided into the following historical periods: Mission, Pioneer, and Railway. The environmental conditions under which the species grow are discussed.—*Roxana Stinchfield Ferris.*

993. SAMUELSON, GUNNAR. **Mossor från Bergens skårgård.** [Mosses from the islands near Bergen, Norway.] Bergens Mus. Aarbok Naturv. Raekke 1917–18[16]: 23–25. 1920.—The list includes hepatics and mosses.—*A. Gundersen.*

994. SETCHELL, WILLIAM ALBERT. **Geographical distribution of the marine spermatophytes.** Bull. Torrey Bot. Club 47: 563–579. 1920.—The marine spermatophytes belong to the families Hydrocharitaceae and Potamogetonaceae, with a total of 8 genera and 34 or 35 species. These are plants all parts of which are subjected to the same conditions of temperature; they show the same temperature-zone relations as do the marine algae, most species being confined strictly to 1 temperature-zone, a few extending over 2 or more. Much additional information is needed to understand the factors concerned in the extensive distribution of some of these plants.—*P. A. Munz.*

995. WARD, H. A. **A new station for Gaylussacia brachycera.** Rhodora 22: 167–168. 1920.—A 3rd station for this species, near Losh's Run, Perry County, Pennslyvania, is reported. The colony covers the northern slope of a mountain ridge for fully a mile, averaging about 200 feet in width. The whole colony has apparently spread by root from a single plant. Later explorations on neighboring ridges brought to light 3 additional colonies, covering a large area and all confined to the northern slopes.—*James P. Poole.*

996. WOODWARD, R. W. **Panicum albemarlense in Connecticut.** Rhodora 22: 182. 1920.—A new station is reported for this species in Franklin, Connecticut.—*James P. Poole.*

997. YUNCKER, T. G. **A list of Indiana mosses.** Proc. Indiana Acad. Sci. 1920: 231–242. 1921.—The author has brought together all the available recorded and unrecorded lists of mosses for the state of Indiana. His report includes 174 species, 32 of which are listed from Indiana for the first time. Under each species data are given regarding stations and the names of collectors.—*F. C. Anderson.*

APPLIED ECOLOGY

998. JOHNSON, E. **Water hyacinth.** Monthly Bull. Dept. Agric. California 9: 77–80. 1920—The water hyacinth (*Eichhornia crassipes* Solms.), a native of tropical South America,

has been introduced into southern rivers of the U. S. A. It is now so abundant in Florida, Louisiana, and Texas as to obstruct navigation. The plant is quite sensitive to salt water but thrives in sub-saline water; it propagates by means of seed and runners. The most effective method of eradication is through spraying with a mixture of white arsenic and sal soda.—*E. L. Overholser.*

999. Pantanelli, E. **Coltivazione a Roma del Ghessab. (Pennisetum spicatum.) [Cultivation of Pennisetum spicatum in Rome.]** Staz. Sperim. Agrarie Ital. 53: 47–66. *Fig. 1–5.* 1920.—The present is a contribution to the study of plant adaptations, together with a botanical description of *Pennisetum* and a chemical study of the plant as regards total and protein nitrogen, fats, sugars, starch, hemicellulose, acidity, ash, and phosphorus. An extensive bibliography is appended.—*A. Bonassi.*

1000. Sauvageau, C. **Sur des algues marines floridées indigènes pouvant fournir de la gélose. [On the indigenous marine algae capable of furnishing gelatin.]** Compt. Rend. Acad. Sci. Paris 171: 566–569. 1920.—The location is given of beds of gelatin-producing red algae on the coasts of France, Spain, other parts of the Mediterranean, and the extreme Orient. The species available are named and the method of extraction of the gelatin is described.—*C. H. Farr.*

1001. Waller, A. E. **The relation of plant succession to crop production.** Ohio State Univ. Bull. 25[9]: 7–74. *15 fig.* 1921.—Following an introduction dealing with the genetic classification of vegetation and the nature of crop ecology, the author presents a general discussion of plant successions and the climatic, edaphic, and biotic factors involved. The 2nd part of the paper treats of the factors influencing crop distribution in the U. S. A.; the importance of economic factors is emphasized. The 3rd part deals with the crop regions of Ohio and their significance. Attention is called to the correlation between the surface geology, natural vegetation, and the crop centers of the state.—*E. N. Transeau.*

1002. Weaver, J. E. **Correlation between the root development of cereals and grassland associations.** [Abstract.] Ecology 1: 65. 1920.

FOREST BOTANY AND FORESTRY

Raphael Zon, *Editor*

J. V. Hofmann, *Assistant Editor*

(See also in this issue Entries 928, 939, 967, 974, 1035, 1054, 1143, 1277, 1296, 1307, 1319, 1331, 1368, 1373, 1374, 1383, 1427)

1003. Anonymous. **Acacia bark as an industrial material.** Sci. Amer. Monthly 2: 340. 1920.

1004. Anonymous. **Forestry legislation.** Science 54: 188. 1921.—This article gives a few statistics, especially for the states of Pennsylvania, Minnesota, and California.—*C. J. Lyon.*

1005. Anonymous. **Report on the Botanical and Forestry Department (Hong Kong, China) for the year 1918.** *18 p.* [Received in the U. S. A. September, 1919.]—The report consists of a collection of short notes dealing with the administration of this department and is primarily of local interest. The notes deal with the activities of the department in connection with the botanical gardens and various grounds and nurseries in charge of the superintendent. The forestry activities include the formation of pine (species not mentioned) and broad-leaved (mainly *Tristania, Melaleuca,* and *Eucalyptus*) plantations, care of plantations, their protection from fire, the work of the forest guards, planting and care of roadside trees, repair of forest paths, clearing away undergrowth for anti-malarial purposes, and the granting of licenses and permits. Appended to the report are 6 tables and a supplement. The tables deal

with annual rainfall, a classification of offenses committed against the forestry laws and the police court results, a list of nurseries, and statement of revenue, including a table showing comparative revenue and expenditure; the total revenue amounts to only 12 per cent of the expenditures. The supplement enumerates a list of 10 additions to the flora of Hong Kong and adjacent territories. The report reveals the fact that this colony received almost 110 inches of rainfall during the year, of which about 90 fell during June, July, August, and September. Typhoon signals were hoisted twice during the year; considerable damage was done by these storms.—*Richard H. D. Boerker.*

1006. ANONYMOUS. **Report on the Botanical and Forestry Department (Hong Kong, China) for the year of 1919.** *17 p.* [Received in the U. S. A. October, 1920.]—The report consists of a collection of short notes dealing with the administration of this department and is primarily of local interest. The notes deal with the activities in connection with the botanical gardens and various grounds and nurseries in charge of the superintendent. The forestry activities include the formation of pine (species not given) and broad-leaved (*Eucalyptus Tristania,* and *Casuarina*) plantations, the care of such plantations, their protection from fire, the work of the forest guards, the planting and care of roadside trees, miscellaneous planting, the repair of roads and paths, the clearing of undergrowth for anti-malarial purposes, and the granting of forestry licenses and permits. To the report are appended 6 tables dealing with rainfall for the year, a classification of the offenses against the forestry laws and the police court results of these, the expenditures on the nurseries, the revenue derived from all sources, and the comparative revenue and expenditure for the entire year. The report discloses that the annual rainfall was about 90 inches, or slightly above normal. Typhoon signals were hoisted twice, the storms doing considerable damage. In 1919 the revenue amounted to 16 per cent of the expenditures, the highest revenue since 1913. Forestry licenses and timber sales furnish the bulk of the income. The total number of persons proceeded against for committing forestry offenses was 477; of this number 354 were convicted.—*Richard H. D. Boerker.*

1007. ANONYMOUS. **Research—an aid to forest perpetuation.** Sci. Amer. Monthly 2: 360–363. *6 fig.* 1920.

1008. ANONYMOUS. **The mountain pride of Jamaica.** Sci. Amer. Monthly 2: 332. *1 fig.* 1920.—*Spathelia simplex* is briefly described.—*Chas. H. Otis.*

1009. ANONYMOUS. **The Tongass national forest.** Science 54: 166. 1921.—The Forest Service of the U. S. Department of Agriculture is selling timber for pulpwood from the forests of Alaska. Statistics on quantities, prices, and arrangements for mills are given.—*C. J. Lyon.*

1010. BEVAN, W. **Cultivation of osiers.** Cyprus Agric. Jour. 16: 37–38. 1921.—The osier, *Salix viminalis,* is a deciduous plant including about 160 varieties. It is the material *par excellence* for basket making. Instructions are given as to its propagation, time and method of planting, and cultivation.—*W. Stuart.*

1011. BRUCE, DONALD. **A white fir volume table.** California Agric. Exp. Sta. Bull. 329. *41–45.* 1921.—The author has prepared a 3-part volume table for the determination of the average volume in board feet of trees of given diameters and heights. The "site" of any given tract is determined by estimating the average height of the tallest tenth of the merchantable trees. If this be over 9½ 16-foot logs, table 1 should be used; if 7½ or under, table 3; and for intermediate values, table 2. The table is based on trees measured (or estimated) outside the bark at 4½ feet from the ground, or on side-hill timber from average ground level. Trees to 8 inches diameter inside bark in top were scaled in 16-foot logs with 0.3 foot trimming allowance, by Scribner Decimal C rule. Table 1 was prepared after making 868 tree measurements, table 2 after 303, and table 3 after 206 tree measurements. As the table is based on trees measured as if sound, unbroken, and completely utilizable, it is essential that percentage reductions be made for rot, breakage, unused tops, and stumps. The cull percentage for white fir commonly ranges from 15 to 35, due mostly to rot and breakage.—*A. R. C. Haas.*

1012. Bühler, A. **Der Waldbau, nach wissenschaftlichen Forschung und praktischer Erfahrung. [Forest production based upon scientific investigation and practical experience.]** Vol. I. *662 p.* Stuttgart, 1918.—This is the first volume of a new book on silviculture and represents the life work of Dr. Bühler. Vol. I presents the natural and the economic factors of forest production, and Vol. II will present the practice of silviculture and the history of silvicultural practice and silvicultural science. Vol. I considers tree species, climatic factors, physiographic factors, soil factors, the silvical requirements of important tree species, and the economic factors of forest production. Under the latter are considered the value and price of forest land, price of labor, markets, the price of wood, and many other factors which affect the economic condition of forest owners. The work contains an abundance of tables.—*Richard H. D. Boerker.*

1013. Endres, Max. **Lehrbuch der Waldwertrechnung und Forststatik. [Forest valuation and forest statics.** *3rd enlarged ed. 324 p.* Berlin, 1919.

1014. Gayer, K. **Die Forstbenutzung. [Forest utilization.]** *11th ed., 642 p., 372 illus.* Berlin, 1919.—This edition was prepared by Ludwig Fabricius of the University of Munich; the 10th edition was prepared by Heinrich Mayr, of the same University, the 9th edition being the last prepared under the personal direction of Gayer, who died in 1907.—*Richard H. D. Boerker.*

1015. Geschwind. **Einige forstliche Wirtschaftsmethoden im herzegowinisch-dalmatinischen Karst. [Some methods of forest culture in the Herzegovinian and Dalmatian Karst.]** Wiener Allg. Forst- u. Jagdzeitg. **39**: 63–64, 72–73. 1921.—Several methods of forest culture peculiar to the southern Karst region are defined and named by the author. "Ograda" is a system under which an area of treeless land is enclosed by a rough wall ("orgrada," a Serbo-Croatian term, refers to wall as well as the area enclosed). Within 1–2 years a dense growth of broadleaf root sprout springs up which otherwise is suppressed by the heavy grazing common in the region. The sprouts are variously used as they reach suitable size; some finally yield merchantable timber. The stand develops into a selection coppice forest, previously described by the author (see Bot. Absts. 8, Entry 1850). In such forests grazing is a secondary consideration.—The "Trava" system is very similar, but in it grazing is the prime consideration. When the walled enclosure produces mostly shrubs or an incomplete cover broken by grassy openings, it becomes more valuable for grazing both in summer and winter (buds and twigs). Such an area, termed a "Trava," gradually develops into an inferior coppice forest; such forests are readily transformed from the "Trava" to the "Ograda" system of management and vice versa. Such variations from standard management are classed as "transition" systems. The "Zukva" method of forest culture is found especially in the coast region near the Gulf of Cattaro, where the Mediterranean broom or "zukva" (*Spartium junceum*) is cultivated upon calcareous soils for winter goat feed. These plants are grown from seed and protected for 4–5 years, after which they will endure grazing; 300 medium-sized bushes will winter 1 goat. The plant is very hardy and drouth resistant, and serves as an excellent nurse tree for *Pinus austriaca*, especially as it enriches the soil.—"Pelin" or "Kadulja" culture is not truly a system of forest culture. *Salvia officinalis*, "pelin" or "kadulja," often occupies overgrazed and denuded lands to the exclusion of other plants, growing into a bush with woody base. This plant is grazed sparingly by sheep and goats when other feed is scarce, but is not touched by cattle. Recently salvia leaves have been collected, dried, and exported for use in cosmetics and medicines. This extensive industry has many opponents because of its tendency to denude areas of even their cover of salvia, with disastrous results to the soil and watershed values. The author considers the practice harmless if leaves and tender tips only are collected in the latter part of the growing season. Season-long collecting and cutting down of bushes, on the other hand is harmful; moreover it interferes with honey production, salvia furnishing a large amount of bee pasturage.—*F. S. Baker.*

1016. Greely, W. B. **What should be our [U. S. A.] national forest policy.** Amer. Forestry **26**: 612–613, 617. 1920.—[Extracts from an extemporaneous address delivered at the reforestation conference of the wood-using industries held at Madison, Wisconsin, July 23, 1920.]

1017. KRESS, OTTO, SIDNEY D. WELLS, AND VANCE P. EDWARDES. **American pulpwoods.** Paper Indust. 1: 362–369. 1919.—A description of 46 woods is given, including data on range, common names, weight, fiber length, and yield and other pulp characteristics.—*H. N. Lee.*

1018. KUBELKA, A. **Neuzeitliche Forstwirtschaft. [Modern forestry.]** Wiener Allg. Forst- u. Jagdzeitg. 39: 93–94. 1921.—The author discusses the experiences and opinions of others in regard to the "continuous" system of forest management (Dauerwaldwirtschaft), as set forth in the author's book, Moderne Forstwirtschaft, and shorter articles in periodicals. The system is essentially natural and aims at continual maintenance of good forest cover, high yield per acre, and natural regeneration. It is the antithesis of clean cutting and planting systems, and denies the necessity of a set rotation and fixed annual fellings.—*F. S. Baker.*

1019. NECHLEBA, A. **Dritter Nonnenbrief aus Böhmen. [Third letter on the nun moth in Bohemia.]** Wiener Allg. Forst- u. Jagdzeitg. 39: 106–107. 1921.—This letter deals chiefly with the results of experiments with chlorophosgene against the nun moth (*Liparis monacha*), as reported in Československý Lesník (Czechoslovenian Forester) no. 33, 1920. Sufficient gas was used to make a stream 60 m. wide and 200 m. long, carried on a gentle wind through a badly defoliated spruce stand. The strength was sufficient to kill a man in 3 minutes. Two hours' application had no other effect than temporarily paralysing large numbers of the male moths; other insects were also unharmed. The current year's growth of spruce was, however, killed. It appears that a special gas must be used which has a positive toxic effect on the moths and which is lighter than chlorophosgene, which fails to reach the treetops effectively. [See also following entry.]—*F. S. Baker.*

1020. NECHLEBA, A. **Zweiter Nonnenbrief aus Böhmen. [Second letter on the nun moth in Bohemia.]** Wiener Allg. Forst- u. Jagdzeitg. 39: 86–87. 1921.—A general discussion is presented of the great increase in the nun moth (*Liparis monacha*) in Bohemia from 1917 to 1920, illustrated with maps showing the partly injured and entirely defoliated areas for each of the 4 years. [See also preceding entry.]—*F. S. Baker.*

1021. SECREST, EDMUND. **Forest planting in Ohio.** Monthly Bull. Ohio Agric. Exp. Sta. 6: 51–58. 1921.—The necessary information desired by land owners who wish to establish woodlands and shelter belts by planting is briefly given. A limited number of species of forest trees are briefly evaluated. Reference is made to most desirable types for post timbers and a more extended discussion is given of conifers and evergreens. Care is taken to include mention of species which are not adapted for planting in Ohio.—*R. C. Thomas.*

1022. SHEPHERD, J. F. **Black-wattle bark for tanning.** New Zealand Jour. Agric. 21: 267–269. 1920.

1023. SIMMONDS, J. H. **Private forestry.** New Zealand Jour. Agric. 21: 271–282. *3 pl.* 1920.—The author describes the various species of forest trees planted 1870–1885. The most promising introduced trees are the conifers from western North America and the eucalyptus from Australia and New Zealand.—*N. J. Giddings.*

1024. TEICHMANN. **Ueber Lupinenanbau. [Lupine culture.]** Wiener Allg. Forst- u. Jagdzeitg. 39: 100–101. 1921.—Clean cutting with complete utilization of litter in the region of Trpist, western Bohemia, raises an exceptionally difficult problem in forest planting. Under these circumstances the soil, derived from slate, bakes badly in summer and planted spruce trees grow poorly. (Southwestern slopes show best results, the litter being too scant to pay for removal and the soil is therefore noticeably lighter from the additional humus.) Weeds quickly claim such cut over lands and compete with the spruce. Plowing to kill the weeds and subsequent care to prevent reinvasion failed to improve the situation. Fertilizing with ammonium sulphate caused an immediate improvement the 1st year which, however, disappeared the 2nd. Sowing lupine seed rather lightly among the planted trees resulted in darker green needles within 2 years; within 6 years the results were excellent, height growth

in spruce amounting to as much as 40 cm. per year, whereas on the untreated areas it averaged hardly 1 cm. of poor, yellowish growth. Lupine flowers within 3 years and begins to reseed the area. Under these conditions there is little danger of choking the spruce. On areas recently cut over without removal of litter, development is much more rapid; large spruce stock must be used and some of the lupine plants too close to the spruce sometimes destroyed. On such sites seed should not be sown close to the spruce. Reference is made to an article by Frič on the same subject (Ceskoslovensky Lesnik Nos. 37–38) which discusses lupine culture under Růžička at Mülhausen.—*F. S. Baker.*

1025. Tschermak. **Die Forstverwaltungsbücherei.** [The forester's book shelf.] Wiener Allg. Forst- u. Jagdzeitg. 39: 111–112. 1921.—This article consists of a list of standard (German) books on different phases of forestry and lumbering, with a short description of the character of each.—*F. S. Baker.*

1026. Valencia, F. V. **Mechanical test of some commerical Philippine timbers.** Philippine Jour. Sci. 18: 485–533. *Pl. 1, fig. 1–19.* 1921.—This preliminary paper gives data collected by the Bureau of Science [P. I.] in cooperation with the Bureau of Forestry [P. I.], serving as a comparison of species as well as the establishment of working stresses. Tests were made of structural timbers and also of small specimens free from defects.—*Albert R. Sweetser.*

1027. Worliczek, C. **Betrachtung über die Erträgnisse der Staatsforste.** [The yield of the state forests.] Wiener Allg. Forst- u. Jagdzeitg. 39: 105–106. 1921.—The statistics on the yield of the state forests of Austria from 1876 to 1920 are discussed showing some of the causes of variation. In general the production is showing a rising trend in relation to the total production of the country.—*F. S. Baker.*

GENETICS

George H. Shull, *Editor*

James P. Kelly, *Assistant Editor*

(See also in this issue Entries 872, 886, 910, 911, 916, 923, 1132, 1136, 1187, 1191, 1195, 1370, 1392)

1028. Anonymous. **An experimental determination of the probable error of Dr. Spearman's correlation coefficients.** Biometrika 13: 263–282. 1921.—When the unit of grouping is small the product-moment method should be used, however small the sample. When one or both variables can be ranked but not scaled, Spearman's ρ is the natural method. In such cases it should be borne in mind that for small samples the mean, even of r_ρ, is lower than that of r, and the σ greater. It is not necessary to determine R and r_R in serious work.—*John Rice Miner.*

1029. Anonymous. **Hereditary trades.** Jour. Heredity 11: 363. *1 fig.* 1920.—The custom is noted of Italian agricultural workers, especially those of the Roman Compagna, to specialize as families in the occupations of reapers, sowers, vine-trimmers, etc.—*Howard J. Banker.*

1030. Anonymous. **Meeting of geneticists interested in agriculture.** Jour. Heredity 11: 384. 1920.—A brief account is given of a meeting held in Chicago, Dec. 28, 1921, attended largely by geneticists connected with the agricultural colleges and experiment stations of the U. S. A. A resolution was adopted favoring administratively independent departments of genetics to give the courses of instruction and direct the investigational work. It is believed this will help to simplify administration, prevent duplication, and give proper standing to the subject of genetics in the curriculum.—*Leon J. Cole.*

1031. Anonymous. **Moral qualities and eugenics.** Jour. Heredity 11: 189. 1920.—A brief comment is made on the significance of mental and moral correlations suggested by the publication of the results of psychological tests in the American Army.—*Howard J. Banker.*

1032. ANONYMOUS. **The birth rate in mixed marriages.** Jour. Heredity 11: 96. 1920.—Review of an article by R. E. MAY in Zeitschr. Sexualwiss. April, 1919.—*Howard J. Banker.*

1033. ANONYMOUS. **The pollination of fruit blossoms.** Gard. Chron. 66: 278–279. 1919.—A list is given of fertile and self-sterile varieties of apples, pears, plums, and cherries. Varieties are listed which should be planted together.—*H. K. Hayes.*

1034. AUMIOT, J. **Expériences de rajeunissement et de perfectionnement de la pomme de terre. [Rejuvenation and improvement of the potato.]** Rev. Gén. Bot. 33: 183–189, 244–263. 1921.—In the section on bud variations the author states that particularly for *Solanum Commersonii* and *S. Maglia* heavy manuring and insolation are important in leading to the condition of non-equilibrium of the pre-mutation period. Many bud mutations are described, among them one of *S. Commersonii* that was productive and disease-resistant, and another from *S. Maglia* that was productive and drought-resistant. The greater part of the report deals with varietal hybrids ("métis") and specific hybrids ("hybrides"). The former are likely to show a preponderating male influence. Emphasis is laid on this "fundamental principle of regeneration and improvement"; the disease-resistance, productivity, vigor, etc., of a varietal hybrid may be superior to that of the better parent. The author refers to contagiousness of leptonecrosis and mosaic and to their not being transmitted by seed. Starting from seed is given as a method of eliminating such infections from stock.—*J. P. Kelly.*

1035. BALLY, W. **Selectie bij rubber en koffie. [Selection in rubber and coffee.]** Mededeel. Proefsta. Midden Java 33: *22 p.* 1920.—The most promising method for improvement in rubber is selection of good latex-producing and disease-resistant trees and subsequent propagation by budding. From present indications the most promising method in coffee is selection of healthy, productive (both in number and weight of fruit) trees and propagation from cuttings or self-fertilized seed.—*Helene Yampolsky.*

1036. BEHRENS. [German Rev. of: YAMAGUCHI, YASUKE. **Über die Beziehung der Aufblühzeit und des Sitzes der Blüte am Rispenaste zum korngewichte des Reises. (The relation of flowering time and the position of the flower on the inflorescence to seed weight in rice.)** Ber. Ohara Inst. Landw. Forsch. 1: 451–517. *35 fig.* 1919 (see Bot. Absts. 9, Entry 1386)]. Zeitschr. Bot. 13: 603–604. 1921.

1037. BISHOP, O. F., J. GRANTHAM, AND M. J. KNAPP. **Field experiments with Hevea.** [Rev. of: (1) BISHOP, O. F., J. GRANTHAM, AND M. D. KNAPP. **Probable error in field experimentation with Hevea.** Arch. Rubbercult. 1: 335–364. 1917. (2) GRANTHAM, J., AND M. D. KNAPP. **Field experimentation with Hevea brasiliensis.** Arch. Rubbercult. 2: 614–630. 1918 (see Bot. Absts. 10, Entry 1054). (3) MAAS, J. G. J. A. **Betrouwbaarheid van Veldproeven bij Hevea. (Reliability of field experiments with Hevea.)** Arch. Rubbercult. 2: 560–607. 1918 (see Bot. Absts. 10, Entry 1068)]. Agric. Bull. Federated Malay States 6: 596–597. 1918.

1038. BLAKESLEE, A. F. **Types of mutations and their possible significance in evolution.** Amer. Nat. 55: 254–267. 1921.—*Mutations of genes.*—Only 3 of these are known in *Datura Stramonium* after many years' observation by several workers. Experiments with *Portulaca grandiflora* confirm the view that these mutations may arise in somatic cells. *Changes in chromosome number.*—In 1 of the dozen or more Daturas with an extra chromosome, the progeny behave as if the gene for purple or white color were tripled, giving the expected ratios in the progeny of both heterozygotes, *Aaa* and *AAa*, after allowing for differential viability of pollen-cells and zygotes. In true tetraploid plants with twice the normal group of chromosomes, the purple-white gene is quadrupled, giving the expected ratios in the progeny of each of the 3 heterozygotes, *Aaaa*, *AAaa*, and *AAAa*. These genetic results, together with the observations on the chromosomes, afford a proof of the chromosome theory of heredity for flowering plants. Apparently the segregation of dwarf forms from the tetraploid form of *Oenothera Lamarckiana* in the cultures of de Vries occurred in the expected ratios, after allow-

ing for differential viability. It is suggested that the terms tetraploid and triploid might well be used, at least in the strict sense, only for plants which have in each set respectively 3 or 4 strictly homologous chromosomes.—In chromosomal duplication no new genes are added. The striking effects produced are due to the disturbance of the normal balance between all the genes of the diploid group of chromosomes. Thus triploid plants, where there is no special disturbance of this balance, are as yet only to be distinguished from normals by their pollen, and the same is the case with some tetraploids.—For the formation of new species from tetraploid plants it seems requisite that the 4 chromosomes of a set should cease to assort at random, and should pair only in separate sets of 2. Such double diploid plants would be distinguished by having duplicate genes, giving a 15:1 ratio when doubly heterozygous. The same would apply to plants with only 1 set of 4 chromosomes, and the rest in pairs.—*John Belling.*

1039. BLARINGHEM, L. **Recherches sur les hybrides du lin (Linum usitatissimum L.) [Studies on the hybrids of flax.]** Compt. Rend. Acad. Sci. **175**: 329–331. 1921.—Flax cultivated for seed is more homogeneous than flax cultivated for fiber. Crossing with white-seeded flax was used to study genetic constitution of the flax of Maroc, the crossing, however, being difficult and resulting in few plants. Brown color and ciliated walls of Maroc proved dominant over white color and naked walls in fruit of flax with white seeds. Maroc shows 2 lines, one acting as a carrier of simple Mendelian characters, the other of complex characters. Separation of lines by testing with known combination is the basis of technique in flax selection. —*Helen D. Hill.*

1040. BLARINGHEM, L. **Variation de la forme des feuilles, corrélatives de la sexualité, observées sur des genévriers (Juniperus chinensis L., J. phoenicia L.). [Variation of the form of the leaves correlative with sexuality observed in the junipers.]** Compt. Rend. Soc. Biol. **84**: 500–502. 1921.—The author examined a male plant of *J. chinensis* and a female plant of *J. phoenicia* for correlation between sporophylls and vegetative leaves. Below were branches with awl-shaped (juvenile) leaves and without cones; above were branches with scale leaves accompanied by cones. A few cases of cones among needle-shaped leaves remind the author of rare cases of paedogenesis, as in *Axolotl.*—*J. P. Kelly.*

1041. CLAUSSEN, P. [German Rev. of: BLAKESLEE, A. F. **Lindner's roll-tube method of separation cultures.** Phytopathology **5**: 68–69. *1 pl.* 1915.] Zeitschr. Bot. **13**: 597–598. 1921.

1042. COLLINS, J. L. **Reversion in composites.** Jour. Heredity **12**: 129–133. *Fig. 16–19.* 1921.—The paper describes and figures a teratological form of *Crepis capillaris* resulting from a cross between Dutch and Swedish strains. Normally the plant has a perfectly smooth and naked receptacle, but on one plant appeared foliaceous palea-like bracts subtending the achenes of every head; this is considered a possible reversion to a pre-composite state. The composite capitulum may be developed through the shortening of a spike, or from an umbel in which the pedicels have disappeared. In the former case, according to James Small, the receptacle might be expected to be conical instead of flat, and in the latter the plant would have lost the bracts subtending the inner pedicels in the pre-composite stage. The author holds that the proliferated *Crepis* head, and also a somewhat analogous one of *Hypochaeris*, which he figures, support the umbellate-origin hypothesis. It is further suggested that in the past the genetic factors involved in producing such structures as are described may have become separated and are rarely brought together in crossing. The case is then to be considered as resembling that of the white sweet-peas which on crossing give a purple, or the mutant types of *Drosophila* which when united produce flies of the wild, or typical, form.—*T. D. A. Cockerell.*

1043. COULTER, M. C. **Mutation.** [Rev. of: (1) BAUR, ERWIN. **Mutationen von Antirrhinum majus. (Mutations of Antirrhinum majus.)** Zeitschr. Indukt. Abstamm.-u. Vererb. **19**: 177–193. *10 fig.* 1918 (see Bot. Absts. 2, Entry 1198; 3, Entry 2183). (2) ZELENY, CHARLES. **The direction and frequency of mutation in a series of multiple allelomorphs.** Anat. Rec. **20**:

210–211. 1921 (see Bot. Absts. 8, Entry 353). (3) MULLER, H. J., AND E. ALTENBURG. **A study of the character and mode of origin of eighteen mutations in the X-chromosomes of Drosophila.** Anat. Rec. 20: 213. 1921 (see Bot. Absts. 8, Entry 306). (4) BRIDGES, CALVIN B. **Vermilion-deficiency.** Jour. Gen. Physiol. 1: 645–656. 1919 (see Bot. Absts. 3, Entry 981). (5) BLAKESLEE, ALBERT F., JOHN BELLING, AND M. E. FARNHAM. **Chromosomal duplication and Mendelian phenomena in Datura mutants.** Science 52: 388–390. 1920 (see Bot. Absts. 7, Entry 858). (6) MULLER, H. J. **Genetic variability, twin hybrids and constant hybrids, in a case of balanced lethal factors.** Genetics 3: 433–499. *1 fig.* 1918 (see Bot. Absts. 2, Entry 257). (7) VRIES, H. DE **Phylogenetische und gruppenweise Artbildung.** (**Phylogenetic and group-wise species formation.**) Flora 11, 12 (Festschr. E. Stahl): 208–226. 1918 (see Bot. Absts. 5, Entry 349).] Bot. Gaz. 72: 178–182. 1921.

1044. CUNNINGHAM, C. C. **Study of the relation of the length of kernel to the yield of corn (Zea mays indentata).** Jour. Agric. Res. 21: 427–438. *Pl. 80–87, 1 fig.* 1921.—Corn from ears with short, smooth, or dimpled kernels, from ears with kernels of maximum length with chaffy crowns, and from ears with kernels of medium length and wrinkled dented, were planted. Seed was continuously selected, smooth, rough, and medium ears being chosen each season from the progeny of smooth, rough, and medium ears, respectively. The 3 types made respective 4-year average yields of 36.5, 35.5, and 34.8 bushels per acre.—Continuous selection of smooth and rather short kernels for 4 generations increased the average length of ears, slightly decreased the weight, and decreased the circumference, number of rows per ear, length of kernel, and percentage of shelled grain; while continuous selection of rough and rather long kernels decreased the average length of ear and increased the circumference, but had no significant effect on the weight of ears, number of rows per ear, length of kernel, or percentage of grain.—*H. M. Steece.*

1045. CZAJA, A. TH. [German Rev. of: STEIL, W. N. **A study of apogamy in Nephrodium hirtipes Hk.** Ann. Botany 33: 109–132. *3 pl.* 1919 (see Bot. Absts. 2, Entry 738).] Zeitschr. Bot. 13: 599–601. 1921.—[See also Bot. Absts. 4, Entry 985.]

1046. DARROW, GEO. M. **Are our raspberries derived from American or European species?** Jour. Heredity 11: 179–184. *4 fig.* 1920.—Because of the relative hardiness of the cultivated red raspberries in America as compared with the European species, pomologists have always considered them as representative of the pure native species *Rubus strigosus*. The author disagrees because of the observed differences in the cultivated varieties from both native and European species. For authority on the botanical characters of the pure native and the foreign species such names are cited as Rydberg, Card, and Foche. Tables are included with brief descriptive terms of 10 varieties of *R. strigosus*, 7 of *R. strigosus* × *R. occidentalis*, 16 of *R. Idaeus*, 9 of *R. Idaeus* × *R. strigosus*, and 3 of *R. Idaeus* × *R. occidentalis*. The derivation of the varieties mentioned in the tables was obtained (1) by an inspection of herbarium material supplemented where possible by observations of the varieties in the field; (2) by a study of the history of the variety in question. The author admits that some of these derivations may be questionable and for final analysis must be submitted to the more rigid tests of the plant breeder.—*L. R. Detjen.*

1047. DYKES, W. R. **Iris acutikor.** (**Iris acutiloba and I. Korolkowi.**) Gard. Chron. 70: 5. 1921.—The author describes and figures a hybrid produced from *I. acutiloba* pollinated by *I. Korolkowi*, the hybrid showing characters of both parents; those that survived were both sturdier and more floriferous than either parent.—*J. Marion Shull.*

1048. EAST, E. M., AND D. F. JONES. **Round Tip tobacco. A plant "made to order."** Jour. Heredity 12: 51–56. *Fig. 1–5.* 1921.—A popular description is presented of the desirable qualities of cigar wrapper leaf, the origin of the Round Tip type, together with the advantages of this type over others grown in the Connecticut Valley. Round Tip is the result of a cross between the Sumatra and Broadleaf varieties, and has been grown commerically sufficiently to indicate that it possesses great possibilities from the farmer's standpoint if the trade will accept the type on its own merits.—*J. Johnson.*

1049. Elderton, Ethel M. **[Rev. of: A study of women delinquents in New York State by Mabel R. Fernald, Mary H. S. Hayes and Almena Dawley with a statistical chapter by Beardsley Ruml and a preface by Katherine Bement Davis.** Century Co.: 1921.] Biometrika 13: 305–308. 1921.—This is said to be the first use of modern statistical methods in a study of women delinquents. Data are confined to mental capacity and main facts of personal and environmental history, as adequate physical and medical facts could not be obtained. The groups studied were: (1) New York State Reformatory women between ages of 16 and 30 convicted of felonies and misdemeanors; (2) Auburn State Prison felons; (3) Magdalen Home sex offenders; and (4) New York County Penitentiary; (5) workhouse, and (6) women's night-court cases. Inebriates are omitted because of inability to obtain accurate information from them, thus eliminating many mental defectives and introducing a serious source of error Variation in the length of period over which the subjects were examined is also a defect. Mental condition was ascertained by Binet Simon 1911, Yerkes Bridges Point Scale, Stanford Revision Binet, Wooley Series, Individual standard tests of ability, and Educational tests; and by social investigation of home, relatives, employers and other agencies in touch with offender. Some correlation was found between age and numberof previous convictions. Foreign white women make up a smaller percentage in each institutional group than in the population as a whole. Offenses of the foreigners were more serious than those of the natives. A correlation of 0.31 was found between condition of home and age at first conviction. In 15.9 per cent of families some other member had been convicted of crime. No correlation was demonstrated between age upon leaving school and first conviction nor between number of convictions and grade reached in school. More domestic workers were included in the group than in the general population, and a lower standard of education prevailed than in other occupations. The younger women had reached a higher grade of education than the older. No correlation was found between earning capacity and number of convictions. Neither lack of education nor low and irregular wages are responsible for delinquency. No relation was seen between habitual use of alcohol, drugs, or cigarettes and intelligence. A correlation of 0.38 occurred between delinquency and intelligence. Also, significant correlations were found between mental capacity and type of occupation, between wage capacity and type of occupation, and between mental capacity and earning capacity.—No control series was used for comparison with normal population. Comparison with men criminals is futile because the offenses of male convicts are not comparable. The data are considered inadequate for treatment of hereditary aspects.—*Miriam C. Gould.*

1050. Fernald, M. L. **The geographic distribution of hybrids.** Science 54: 73–74. 1921.—Kerner is quoted on cases of assumed hybrids of *Nuphar*, *Salvia*, and *Rhododendron* which spread beyond the limits of the parent species and are then indistinguishable from true species. Similar cases were recorded by the writer in *Rubus.*—*T. D. A. Cockerell.*

1051. Fleischmann, Rudolf. **Beiträge zur Leinzüchtung. [Contributions to flax breeding.]** Zeitschr. Pflanzenzücht. 8: 26–43. 1921.—Certain results in practical fiber-flax breeding are detailed relative to variation, correlation, and inheritance of stem length. Breeding material was taken from fields in 2 districts of Hungary. Branched portion of flax plant showed greater variability than lower, unbranched, portion. The author concludes that clearer, more accurate results were obtained by limiting the study to unbranched part of stem. Intensity of inheritance was measured by coefficient of correlation of length of stem from one generation to next. This coefficient was generally high but varied according to weather conditions. (Two crops were raised each season.) Inheritance of stem length was as pronounced with selected lines as in general, unselected stock. In series of selected lines showing decrease in stem length, the standard deviation was found also to decrease coincident with approach to a symmetrical type of curve. Skewness decreased as mean length diminished; this did not hold true in mixed populations. Absolute decrease of stem length, brought about by weather conditions, was relatively greater in selected lines of maximum stem length; results of this character were less marked in unselected stocks. Hot, moist weather in 2nd half of 1920 decidedly increased the coefficient of variation. Stem length was not significantly increased, but flowers and bolls were markedly increased and also basal branches. Selection of stem length within (presumably) pure lines showed no significant influence.—*L. R. Waldron.*

1052. FORBES, A. W. **Education and the size of families.** Jour. Heredity 12: 190–191. 1921.—The author advances an economic theory in explanation of the small families among college graduates and other educated people. The colleges increase the income of older people, but decrease the income of young people. The standard of living depends largely on the income of the parents. "The condition most favorable to large families is an income of the sons equal to that of the parents at as early an age as possible. At present this condition is met among those of inferior parents. . . . . . . It is farthest from being true among those with the best inheritance, and the colleges are largely responsible for the condition."—*Howard J. Banker.*

1053. GOETZ, E. **Tabakanbauversuche. [Tobacco culture investigations.]** Badisches Wochenbl. 1919: 67–69. 1919.—The yield of pure lines of tobacco is compared with that of the F_1 hybrids of the lines. The mean of parental lines is usually lower than that of F_1 hybrids. In some cases the F_1 exceeded that of the higher-yielding parent. [From anonymous Abstract in Zeitschr. Pflanzenzücht. 7: 35. 1919.]—*J. P. Kelly.*

1054. GRANTHAM, J., AND M. D. KNAPP. **Field experimentation with Hevea brasiliensis.** Arch. Rubbercultuur 2: 614–630. 1918.—Yields are given from a large number of individual trees for a period of 12 months. From these data conclusions are drawn concerning the probable error which must be applied in interpreting results of field trials. The error calculated on a tree basis is lower than that calculated on an area basis. The error is not reduced by continuing the experiment longer than 6 months. The use of square plots is advised. No increase in accuracy results from using a plot of more than 100 trees. The theoretical reduction of error by duplication of plots is secured up to the 8 duplications made in the experiment. More than 10 or 15 duplications are generally inadvisable. A probable error of 6 per cent may be used for 100 tree plots. A precision of less than 5 per cent is not considered practical. [See also Bot. Absts. 10, Entry 1037.]—*Carl D. La Rue.*

1055. HARLIN, RALPH G. **A case of inherited syndactyly in man.** Jour. Heredity 11: 334–335. *1 fig.* 1920.—A type of syndactyly taking the form of a partial webbing between the 2nd and 3rd toes occurs in a man, his only son, and 3 of the son's 6 children. The subjects are members "of an old New England family whose genealogy has been fully investigated and published." Despite the fact that this man was one of 10 children, and his presumably normal father one of 6, the trait does not occur in any of the collateral lines. Since the degree to which the trait is manifested is variable the author suggests that it may often pass unnoticed. —*C. H. Danforth.*

1056. HARRIS, J. ARTHUR, WM. F. KIRKPATRICK, A. F. BLAKESLEE, D. E. WARNER, AND L. E. CARD. **The egg records of limited periods as criteria for predicting the egg production of the white leghorn fowl.** Genetics 6: 265–309. *10 diagrams.* 1921.—By mathematical formulae derived from the egg records of hens entered at the Storrs Contest 1911–1917, the authors were able to predict with fair accuracy the annual egg record of any hen in the contest when the record for 1 month was known. A 2-month record gave slightly greater accuracy to the prediction. The formulae could also be used on whole flocks of the same breed, but longer periods gave more decided improvement in the accuracy of the predictions. In either case the hens were kept under essentially the same conditions throughout the time the tests were carried out.—*H. G. May.*

1057. HENDRICKSON, A. H. **Inter species pollination of plums.** Proc. Amer. Soc. Hort. Sci. 16: 50–52. 1919 [1920].—The varieties used were Burbank (*Prunus triflora*), Reine Claude (*P. domestica*), German Prune (*P. domestica*), and Shropshire (*P. insititia*). Results at the second examination, June 12, were as follows: In Burbank, 2281 open-pollinated flowers set 1.2 per cent; 150 flowers selfed set 0.0 per cent; 316 flowers × Reine Claude set 5.4 per cent. In Reine Claude, 3505 open-pollinated flowers set 7.1 per cent; 312 flowers selfed set 12.8 per cent; 322 flowers × Burbank set 0.6 per cent; 488 flowers × German Prune set 13.8 per cent. In German Prune, 3496 open-pollinated flowers set 20.0 per cent; 426 flowers selfed set 0.0

per cent; 396 flowers × Shropshire set 29.6 per cent; 354 flowers × Reine Claude set 47.4 per cent. In Shropshire, 3591 open-pollinated flowers set 5.8 per cent; 599 flowers selfed set 2.0 per cent; 433 flowers × German Prune set 13.6 per cent; 381 flowers × Reine Claude set 12.0 per cent. Inter-species crosses between *P. triflora* and *P. domestica* and between *P. domestica* and *P. insititia* are fertile.—*C. S. Crandall.*

1058. JACOB, JOSEPH. **Tulip thieves.** Gard. Chron. 69: 299. 1921.—The author refers to an item by E. H. Krelage, published in 1881, concerning an occasional form of atavism in which tulips return to a form with narrow petals, mostly of one color,—a pale mauve pink. He adds to these "thieves" another form in which, instead of blooming, the bulb produces but one big leaf and later many small bulblets, which continue to behave in the same manner and, if not rogued out, presently dominate and produce a deteriorated stock.—*J. Marion Shull.*

1059. JONES, SARAH V. H. **Inheritance of silkiness in fowls.** Jour. Heredity 12: 117–128. *Fig. 9–15.* 1921.—The author reviews the literature on several silky breeds of fowls and shows that the sporadic appearance of silky-feathered individuals in flocks of normally-feathered fowls is not rare. Previous work on the genetics of silkiness is summarized and data covering the genetic constitution of a sporadic silky individual are presented which show that it is genetically identical, so far as feather structure is concerned, with the common Japanese silky breed.—*W. A. Lippincott.*

1060. KEMPTON, J. H. **Heritable characters of maize. V. Adherence.** Jour. Heredity 11: 317–322. *Fig. 16–19.* 1921.—Adherence is a variation in which the leaves, bracts, and inflorescences coalesce. In some cases this abnormality is apparent in the seedling stage, but such plants usually recover and grow normally until the ear-bearing node is reached, when adherence again appears. Because of the coalescence of the upper leaves and tassel the latter is exserted with difficulty. The tassel branches cling together to form a solid structure so that pollen is shed only from the spikelets of the lower and outer branches. This abnormality is apparently due to a single Mendelian factor and can very readily be eliminated.—*W. H. Eyster.*

1061. LAMON, HARRY M. **Lamona—a new breed of poultry.** Jour. Heredity 12: 3–29. *Frontispiece, fig. 1–26.* 1921.—The author attempted to establish a new breed of fowls combining the characters of the egg and meat types, and laying white eggs. White Plymouth Rocks and White Leghorns were used, the former as a general utility bird and the latter as the egg type, used also to introduce the white egg character. The Silver Gray Dorking was used to introduce good meat qualities and the long, rectangular body. The object was "to produce a breed of fowls of two varieties (single and rose comb) having the shape, size, and market qualities of the Dorking with a yellow skin, white plumage, and four toes, and that will lay a large, white egg." The project, begun in the spring of 1912, has been carried through several generations and the single-comb variety has been fairly well established.—*H. G. May.*

1062. LAUGHLIN, HARRY H. **Race assimilation by the pure-sire method.** Jour. Heredity 11: 259–263. *4 fig.* 1920.—The greater potency of the pure-sire method over the pure-dam method in race assimilation is demonstrated from both physiological and social considerations. The latter are dwelt upon at considerable length and illustrated with pedigree charts from early Spanish-American sources, from a hypothetical case in Ibanez's "The Four Horsemen of the Apocalypse", from a Jamaican Jewish-Negro family, and from a Jamaican Hindu-Negro family. The writer concludes, "whenever 2 races come into intimate contact the upper race tends to remain pure while the lower tends toward assimilation into the upper by the pure-sire system."—*Howard J. Banker.*

1063. LILIENFELD, F. **Die Resultate einiger Bestäubungen mit verschiedenaltrigem Pollen Cannabis sativa. [Results of pollinations of Cannabis sativa with pollen of different ages.]** Biol. Zentralbl. 41: 295–303. 1921.—The author tested the claims of Ciesielski

that hemp pollinated with fresh pollen produces a great preponderance of staminate plants while pollination with old pollen (12 hours old) gives a preponderance of carpellate plants. Ciesielski's results were not substantiated as the author obtained an average of 37.77 per cent staminate and 62.27 per cent carpellate plants with fresh pollen and 38.55 per cent staminate and 61.45 per cent carpellate plants with pollen 12 hours old. With pollen 30 hours old 45.14 per cent staminate and 54.86 per cent carpellate plants were obtained, while pollen 36 hours old gave 40.25 per cent staminate and 59.75 per cent carpellate plants. These numbers all come within the natural fluctuation of the sex ratio of hemp. The author thinks the progressive increase in the proportion of staminate to carpellate plants with increased age of the pollen might be due to a difference in the vitality of male- and female-determining pollen grains resulting in elimination of the weaker group.—*John H. Schaffner.*

1064. LINDSTROM, E. W. **Chlorophyll factors of maize.** Jour. Heredity 11: 269–277. *3 fig.* 1920.—Factors responsible for chlorophyll deficiencies which decrease or limit the productivity of maize are apparently present in a number of different chromosomes. The elimination of such chlorophyll deficiencies by inbreeding will result in the loss of the favorable growth factors located in the same chromosomes. For this reason material relatively free of abnormalities should be chosen for inbreeding, and it is probable there would be very little loss of stature, yield, or fertility.—*W. H. Eyster.*

1065. LIPPINCOTT, WILLIAM A. **A hen which changed color.** Jour. Heredity 11: 342–348. *Fig. 1–7.* 1920.—This is an account of a pedigreed Blue Andalusian hen which gradually became pure white through replacement, at successive annual molts, of colored feathers by white ones. The bird was bred and shown by several tests to have retained her original genetic constitution.—*H. D. Goodale.*

1066. LOMEN, G. J. **The reindeer industry in Alaska.** Jour. Heredity 11: 243–252. *Frontispiece, 10 fig.* 1920.—The reindeer's characteristics and habits are briefly described, and the significance of the antlers is discussed. Small antlers are considered a sign of deterioration while straight antlers are believed to indicate sterility. The doe gives birth to 1 (rarely 2) fawn annually. The period of gestation is 7 months and 7 days, and the does continue to breed until 14 or 15 years of age. There is necessity for improvement due to inbreeding of the Siberian stocks first imported, and to the possible use of the caribou as a source of improvement.—*Edward N. Wentworth.*

1067. LUSH, JAY L. **Inheritance in swine.** Jour. Heredity 12: 57–71. *Fig. 6–19.* 1921. —The author reports on the data accumulated in a series of experiments conducted at the Kansas Agricultural Experiment Station. These experiments, interrupted by the war, ended with the F_1 and F_2 generation. To study litter size the wild boar, which normally produces 4 pigs at a birth, was crossed to the Tamworth, which normally produces about 11 pigs. One F_1 sow produced 4 pigs indicating a dominance of wild litter size. Inter-crosses of Berkshires, Tamworths, Duroc-Jerseys, and wild indicated that the erect carriage of ear is dominant, although dependent on more than 1, but less than 3, factors. Sharp dish of face and short face proved dominant to other classes. The production of bright pigment was found to be dependent on a single factor difference, while the differences between red, white, and sandy were shown to be due to 2 factors, either one of which in the absence of the other probably produces sandy, while one intensified the other to produce red; absence of both causes white. Comparison of growth curves in F_1 and F_2 generations is significant only in so far as it indicates increased variability for the F_2 generations, the average difference in the coefficients of variability at ages 1–13 months being about 6 per cent.—*Edward N. Wentworth.*

1068. MAAS, J. G. J. A. **Betrouwbaarheid van veldproeven bij Hevea. [Reliability of field experiments with Hevea.]** Arch. Rubbercultuur 2: 560–607. 1918.—The application of statistical methods to data from field experiments with Para rubber is discussed. The principal factors which cause variability are given, and the extent to which these factors may be controlled by the experimenter is considered. The writer believes the standard deviation to

be a more reliable measure of variation than the probable error where only a small number of plots is used. Data from 2 extensive experiments are given. The necessity of making preliminary experiments before planning extensive trials is pointed out, and the need of care in the choice of experimental plots is emphasized. [See also Bot. Absts. 10, Entry 1037.]—*Carl D. La Rue.*

1069. MARCH, LUCIEN. **La méthode statistique.** [**The statistical method.**] Metron 1: 22–52. 1920.—The aim of science is the classification of observations. The experimental method studies the relation of an effect to a single cause when other causes are held constant. When the various causes can not be isolated the statistical method must be used. Analysis of this method may be divided into 3 parts: (1) Comparison of centering constants; (2) study of variability within the group; (3) study of relationships between groups. Properties of the median and arithmetical mean are discussed.—*John Rice Miner.*

1070. MARSHALL, ROY E. **Report of three years' results in plum pollination in Oregon.** Proc. Amer. Soc. Hort. Sci. 16: 42–49. *2 pl.* 1919 [1920].—See Bot. Absts. 6, Entry 129.

1071. MELLON, RALPH R. **The life-cycle changes of the so-called Corynebacterium Hodgkini, and their relation to the mutation changes in this species. Fourth paper on diphtheroids.** Jour. Med. Res. 42: 61–76. 1920.—The strain of *C. Hodgkini* used, when cultivated under ordinary conditions, is generally non-granular. It infrequently develops "giant cocci," which respond to the stimulus of new environment; e.g., when cultured in broth plus rabbit serum they give rise to coccoid forms of irregular size, which continue development, with increase of chromatin, when 1 per cent maltose is added to this medium. Whether this process is degenerative or vitalistic is seen in the stabilization of the offspring obtained by the different modes of reproduction, viz., gemmation and sporulation (?); gemmation produced 3 generations unchanged. Response to environment is further emphasized by the fact that granular coccoid forms develop in serum broth but do not develop in hydrocele fluid. Arrested bacillary growth favors coccoid formation, a phenomenon which is constant.—The staining of chromatin and achromatic areas of the organism follows laws analogous to chemical reversibility and tautomerism.—The morphologic mutation effected by rotation seems to be of a cyclic character; however a return of the coccoid to the bacillary form has not been determined.—*Andrew I. Dawson.*

1072. MOL, W. E. DE. **Over het voorkomen van heteroploide varieteiten van Hyacinthus orientalis L. in de Hollandsche kulturen.** [**On the occurrence of heteroploid varieties of Hyacinthus orientalis in Dutch cultures.**] Genetics 3: 97–192. 1921.—The named hyacinth clones in which the somatic numbers of chromosomes were counted may be classed as follows:

NUMBER OF SOMATIC CHROMOSOMES	NUMBER OF DIFFERENT CLONES	NUMBER OF CHROMOSOMES OF THE DIFFERENT SIZES		
		Short	Medium	Long
16 (diploid)	19	4	4	8
19	1	4	6	9
20	1	5	5	10
21	1	5	6	10
22	1	5	6	11
23	1	5	5	13
24 (triploid)	4 (or 5)	6	6	12
27	2	7	8	12
		8	8	11
28	2	7	6	15
30	1	7	8	15

—*John Belling.*

1073. MOORE, CARL R. **On the physiological properties of the gonads as controllers of somatic and psychical characteristics. IV. Gonad transplantation in the guinea-pig.** Jour. Exp. Zoöl. 33: 355–389. *4 fig.* 1921.—This is a continuation of the author's previous work. Ovarian grafts in castrated male guinea-pigs lead to an hypertrophy of the teats, but no hyacquisition of female instincts occurs. Testicular grafts in spayed females produces hypertrophy of the clitoris, and male behavior. These results differ somewhat from those obtained with rats.—*H. D. Goodale.*

1074. OKKELBERG, PETER. **The early history of the germ cells in the brook lamprey, Entosphenus wilderi (Gage), up to and including the period of sex differentiation.** Jour. Morphol. 35: 1–151. *12 pl., 4 fig.* 1921.—This species shows juvenile hermaphroditism, with males and females in approximately equal numbers in the adult condition. This indication that sex is not irrevocably determined at time of fertilization and the lack of a complete account of germ-cell cycle for any vertebrate accounts for this work. Primordial germ cells are first recognized (by their size, structure, and position) when the mesoderm begins to separate from the entoderm before germ layers are definitely established (embryo about 191 hours old). They lie laterally in the posterior region of the mesentoderm, later through shifting of surrounding tissue and independent migration they come to a median position. The number is small (36 were found in one larva). They are the sole source of definitive germ cells in both sexes and never give rise to somatic tissues. From time of segregation up to 20 mm. stage of the embryo (about 4 months) these cells do not divide. From 20 to 35 mm. an indefinite number of divisions occur. Larvae up to this time are indifferent as to sex. From 35 to 70 mm. they become hermaphroditic as judged by the production in all gonads of large yolk-laden cells, which are considered as egg cells. A series of gonads gives from 0 to 100 per cent of these large cells. Reproductive organs (gonads and accessory structures) are simple and morphologically quite similar in adults of both sexes. This may be related to tendency of species towards juvenile hermaphroditism. The author concludes: First sexual changes appear in gonad, each of which contains 2 kinds of cells, those with tendency for rapid division (katabolic) and those with tendency for growth (anabolic). Difference is considered to be due to disturbance of metabolism of cells during mitoses or to environmental conditions. Relative proportions of anabolic and katabolic cells determine whether larva becomes male or female; therefore, sex is not irrevocably fixed at fertilization. The author grants that sex is ordinarily an hereditary character associated with sex chromosomes but holds them to be only one link in series of processes which determine sex, so that in a form like the lamprey with very little difference between sexes other factors may overcome the effects of the sex chromosomes; from this he infers that other hereditary characters may also be modifiable and points out that should such prove true there would be less objection to the idea that sex character may be modified. Secondary sex characters are probably not genetic but due to hormone action. In addition, the paper contains an account of habits and life history, list of important contributors to various theories of origin of germ cells in vertebrates with conclusions of each, and an unusually full discussion of literature bearing on subjects of hermaphroditism and sex-determination.—*E. Eleanor Carothers.*

1075. PINOY, P. E. **Sur la germination des spores, sur la nutrition, et sur la sexualité chez les Myxomycètes. [Germination of spores, nutrition, and sexuality in the Myxomycetes.]** Compt. Rend. Acad. Sci. Paris 173: 50–51. 1921.—The author replies to investigators who have opposed his conclusions regarding the Myxomycetes, and restates his theory, which holds that sexuality in the slime molds consists in the union of individual (+) and (–) myxamoebae to form plasmodia capable of fruiting.—*A. F. Blakeslee.*

1076. PLAHN, APP. **Die Bestimmung der Bruchfestigkeit der Getreidehalme. [The determination of brittleness of cereal culms.]** Deutsch. Landw. Presse 1920.—This article deals with the tests for load of single stems and sections of stems recommended by Kraus and Holdefleis, and brings investigational methods into a definite system. [From author's abstract in Zeitschr. Pflanzenzücht. 8: 63. 1921.]—*J. P. Kelly.*

1077. Popenoe, Paul. [Rev. of: Gager, C. Stuart. **Heredity and evolution in plants.** *14 × 20 cm., xi + 265 p., 113 fig.* P. Blakiston's Son & Co.: Philadelphia, 1920 (see Bot. Absts. 6, Entry 1672; 7, Entries 178, 1610; 8, Entry 1079).] Jour. Heredity 12: 198. 1921.

1078. Popenoe, Paul. **Measuring human intelligence.** [Rev. of: Goddard, Henry Herbert. **Human efficiency and levels of intelligence.** *128 p.* Princeton Univ. Press: Princeton, 1920.] Jour. Heredity 12: 231–236. 1921.

1079. Popenoe, Paul. [Rev. of: Stoddard, Lothrop. **The rising tide of color.** *320 p., 3 maps.* Charles Scribner's Sons: New York City, 1920.] Jour. Heredity 12: 204. 1921.

1080. Popenoe, Wilson. **The Colombian berry or giant berry of Colombia.** Jour. Heredity 11: 195–203. *Frontispiece, 4 fig.* 1920.—In 1914 the giant blackberry of Colombia was introduced into the U. S. A. from El Peñon, Colombia. In 1920 the author studied the species in its native habitat, and concluded that the Colombian berry is probably closely related to *Rubus roseus*, and best adapted to the southern and western (U. S. A.) states. Though fair to good in quality, the berry will probably prove most useful for work in hybridization because of its great size, the berries often measuring 2.5 × 1.5 inches. It is suggested that the name be changed from "giant blackberry of Colombia" to "Colombian berry." The fruit, plant and cultural requirements are described. David Fairchild appends a note referring to accounts of the berry by the explorers in Col. Roosevelt's expedition to South America in 1914.—*L. R. Detjen.*

1081. Roberts, Elmer. **Polydactylism in cattle.** Jour. Heredity 12: 84–86. *6 fig.* 1921. —Three generations of polydactylism in cattle are reported, the abnormality appearing to behave as a dominant Mendelian unit.—*Sewall Wright.*

1082. Safford, W. E. **Datura—an inviting genus for the study of heredity.** Jour. Heredity 12: 178–190. *Fig. 10–16.* 1921.—Species and varieties in the genus *Datura* are distinguished, and the probable origin of several forms and their use as narcotics, poisons, and aphrodisiacs are discussed. Mention is made of previous genetic studies within the species *D. Stramonium*, and several interspecific crosses are suggested as likely to yield results of interest to plant breeders.—*A. F. Blakeslee.*

1083. Savelli, R. **Anomalie della plantule e anomalie di germinazione di nicotiana.** [**Anomalous condition in seedlings and the germination of tobacco.**] Nuovo Gior. Bot. Ital. 27: 129–153. 1920.—A study of 450,000 seedlings showed as many as 2,800 cases of divergence from the normal in the development of the cotyledons. The tricotyledonous condition was most common. The work is to show the great teratological variability of a given species. Although the author's observations are numerous, he believes they can not qualitatively and quantitatively demonstrate the true state of affairs. He promises to take up later, more extensively and with better material, the interesting study of teratological heredity and its problems.—*Ernst Artschwager.*

1084. Schürhoff, P. N. **Über die Teilung des generativen Kerns vor der Keimung des Pollenkorns.** [**Division of the generative nucleus preceding germination of the pollen grain.**] Arch. Zellforsch. 15: 145–159. *1 pl.* 1919.—In *Sagittaria sagittifolia* and *Melandrium album* the cell wall between the vegetative nucleus and the primary generative nucleus disappears, and the cytoplasm becomes confluent. In *Sambucus racemosa* no cell wall is formed between these 2 nuclei. In no case was a special layer of cytoplasm found around either of the 2 ultimate generative nuclei.—*John Belling.*

1085. Setchell, W. A., T. H. Goodspeed, and R. E. Clausen. **A preliminary note on the results of crossing certain varieties of Nicotiana tabacum.** Proc. Nation. Acad. Sci. [U. S. A.] 7: 50–56. 1921.—The Mendelian results of 3 crosses between certain varieties of tobacco selected as fundamental varieties, or "stem forms," are described. The investigation seeks to unravel the problem of the origin of the numerous cultivated forms by determining which

of the few historically old varieties possess in various combinations all the characters exhibited by commercial varieties, and then to interpret existing varieties on the basis of hybridization with resulting segregation and recombination of characters.—The studies reported are concerned with flower color, flower form, and leaf-base, in which mono- and bigenic results were secured although the data are complicated in some cases by the semi-quantitative nature of the character differences. In general it is concluded that the results demonstrate the complexity of difference from a genetic standpoint between any 2 of the so-called fundamental varieties of *N. tabacum*, and that it is futile to determine affinities on the basis of morphological studies unaccompanied by experimental investigations. More detailed reports of this series of studies are promised.—*J. Johnson.*

1086. SHAMEL, A. D. **Origin of a new and improved French prune variety.** Jour. Heredity 10: 339–343. *Frontispiece, 3 fig.* 1919.—An improved strain of French prune (Prune d'Agen), which originated as a bud sport, is described. The new prune (designated as No. 1418) is roundish-oval in contrast with the pyriform typical French prune. The tree is apparently more vigorous and has larger and heavier foliage than the parent tree. Occasionally spurs are found on the new strain which produce prunes similar to those of the parent variety. The dried prunes of the new strain are said to average 25–30 to the pound, as compared with 50–60 to the pound for the ordinary type.—*A. H. Hendrickson.*

1087. STANDLEY, PAUL C. **Albinism in the black bear.** Science 54: 74. 1921.—The author calls attention to a statement by John Tanner in a book published in 1830, relative to an old albino female bear with 1 albino and 3 pigmented cubs. If albinism in bears is assumed to be recessive, the male parent of the albino cub must have been heterozygous.—*H. L. Ibsen.*

1088. STURTEVANT, G. **Notes from my hybridization records.** Bull. Amer. Iris Soc. 2: 29–30. 1921.—The author gives a list of 87 varieties of Irises which have proved fertile; 7 which have not seeded but have fertile pollen; 4 which have set seed but in which pollen is absent or sterile; and 21 that are sterile. It is stated that plants resulting from wide crosses are usually sterile.—*J. Marion Shull.*

1089. T[ANSLEY], A. G. [Rev. of: HAGEDOORN, A. L., AND A. C. HAGEDOORN. **The relative value of the processes causing evolution.** *294 p.* Martinus Nijhoff: The Hague, 1921.] New Phytol. 20: 124–131. 1921.

1090. THADANI, K. I. **A toothless type of man.** Jour. Heredity 12: 87–88. 1921.—"There occurs in the Hindu Amil community of Hyderabad Sind, a town in India, a type of men who have no teeth. These men are further characterized by a bald head and an extreme sensitiveness to heat. They are known as 'Bhudas' which literally means 'toothless.'" The known facts concerning heredity in these men indicate that the condition is a typical case of sex-linked inheritance. The writer seeks further information.—*Howard J. Banker.*

1091. THJOTTA, TH., AND ODD KINCK EIDE. **A mutating, mucoid paratyphoid bacillus isolated from the urine of a carrier.** Jour. Bacteriol. 5: 501–510. 1920.—An account is given of a paratyphoid bacillus which suddenly began to be given off by a carrier and which differed from the common type in forming masses of mucus enclosing either one or more bacilli in a common capsule. This mucus covering which resulted in a retarded activity on the part of the mutant over the common type, appeared upon repeated cultivation, to be a constant character.—*Chester A. Darling.*

1092. THOMSON, J. ARTHUR. [French Rev. of: BLARINGHEM, L. **Les problèmes de l'hérédité expérimentale. (The problems of experimental heredity).** *12 × 19 cm., 317 p., 20 fig.* Ernest Flammarion: Paris, 1919 (see Bot. Absts. 4, Entry 523).] Scientia 30: 153–154. 1921.

1093. TRACHTENBERG, H. L. **The analysis of the results of Professor Johannes Schmidt's diallel crossings with trout.** Jour. Genetics 11: 75–78. 1921.—The author finds some of

Schmidt's computations defective, in that Schmidt introduces an "arbitrary assumption" which Trachtenberg regards as unnecessary. The latter using another set of equations, arrives at "generative values" slightly different from those obtained by Schmidt. However, the two authors are in substantial agreement as regards results.—*F. B. Sumner.*

1094. Weathers, John. **Unusual forms of Iris flowers.** Gard. Chron. **70:** 85. 1921.—This account of 4- and 5-parted teratological flowers of *Iris squalens* (illustrated) and *I. germanica,* includes a speculation as to a former closer structural relationship between monocotyledonous and dicotyledonous plants.—*J. Marion Shull.*

1095. Woodruff, Lorande Loss. **The present status of the long-continued pedigree culture of Paramecium aurelia at Yale University.** Proc. Nation. Acad. Sci. [U. S. A.] **7:** 41–44. *1 fig.* 1921.—The author attempts to bring up to date and to summarize the chief results obtained from the study of his, now classic, pedigreed culture of *P. aurelia.* This culture was started May 1, 1907, by the isolation of a "wild" specimen found in the laboratory. Four lines from this original organism were then maintained by the daily isolation of a specimen from each line. Although these 4 lines were kept distinct, cells from one line were used to replenish another if it died out. The author kept careful records of time of isolation, division rate, etc., and made permanent preparations from time to time. After 5 years, during which over 3029 generations were attained, the author reached the conclusion that "the protoplasm of a single cell may be self-sufficient to reproduce itself indefinitely, under favorable environmental conditions, without recourse to conjugation. . . . ." Although it was demonstrated that conjugation was not necessary for the continuance of asexual reproduction, and although the organisms showed very little tendency to conjugate, the author showed that conjugation could take place. Thus in mass cultures derived from his pedigreed culture he was successful in obtaining epidemics of conjugation in December, 1913 (at the 4100th generation), and in June, 1920. A careful study of sidelines derived from the main lines showed that there were inherent and periodic increases and decreases in the fission rate. The search for the underlying factors involved in these so-called rhythms led to the discovery of endomixis, whereupon, on May 1, 1915, at the 5071st generation, the author considered the experiment formally closed. Since then, however, he has maintained the culture, but without exact daily observation and record. At the time of writing (December, 1920) the culture had been continued 13.5 years with the attainment of approximately 8400 generations. Therefore the conclusion is still justified that, provided *P. aurelia* lives under favorable conditions, conjugation is not an essential phenomenon in its life history. An internal reorganization process (endomixis) does, however, take place periodically. This gives rise to the following question, which is now under investigation: Is endomixis necessary for the continuance of the race?—*W. H. Taliaferro.*

1096. Woods, Frederick Adams. [Rev. of: Ireland, Alleyne. **Democracy and the human equation.** *251 p.* E. P. Dutton & Co.: New York, 1921.] Jour. Heredity **12:** 205–208. 1921.

HORTICULTURE

J. H. Gourley, *Editor*

H. E. Knowlton, *Assistant Editor*

(See also in this issue Entries 861, 928, 937, 1046, 1054, 1086, 1088, 1191, 1192, 1289, 1316, 1324, 1330, 1357, 1358, 1372, 1402, 1415, 1428)

FRUITS AND GENERAL HORTICULTURE

1097. Anonymous. **Acid for hastening germination.** Florists' Exchange **50:** 211. 1920.—In a previous article it is recommended to steep seed in sulphuric acid for 10–30 minutes, according to the degree of hardness of the seed. After treatment the liquid is drained off

and the seed washed immediately in at least 3 changes of water, and dried sufficiently for sowing. One lot of seed, all from 1 plant and untreated, was sown under glass in the fall. After 3 weeks none had germinated, and the seeds were dug up, sifted from the soil, treated with acid, and replanted; seedlings appeared above ground 4 days later. Of a dozen seed of the same lot sown in the open ground in the following April and left 3 months, only 1 germinated, though the author feels, from his previous experience indoors, that most if not all were alive.—*Lua A. Minns.*

1098. ANONYMOUS. **Protecting trees and shrubs from mice.** Florists' Exchange 49: 1298. 1920.—W. N. Craig of Brookline, Massachusetts, is quoted as to an effective method of preventing injury. To 5 gallons of lime sulphur (undiluted) are added 5 pounds dry lead arsenate, 3 gallons Scalecide (or some other soluble oil), and 5 pounds salt; directions for applying with a brush are given. The mixture sticks, a second application being unnecessary, and does not harm the trees. The protection of evergreens is more difficult as the brush can not be used effectively, but Mr. Craig thinks that the mixture diluted sufficiently to pass through a nozzle under pressure will prove equally efficient.—*Lua A. Minns.*

1099. ADDIS, J. M. **Excursión horticola. Estudio de los platanos y guineos cubanos. [A survey of Cuban plantains and bananas.]** Rev. Agric. Com. y Trab. [Cuba] 3: 418–429. *18 fig.* 1920.—This is an account of a search for new varieties of bananas and plantains (*Musa sapientum*, *M. paradisiaca*, and *M. cavendishii*) to add to the collection at the Agronomy Experiment Station [Santiago de las Vegas, Cuba]. Lists and descriptive notes of the varieties found are included. Some plants near Baracoa were found affected with nematodes.—*F. M. Blodgett.*

1100. ALLEN, W. J., AND R. G. BARTLETT. **Advice to intending growers of bananas.** Agric. Gaz. New South Wales 32: 575–577. 1921.

1101. BEVAN, W. **Citrus trees.** Cyprus Agric. Jour. 16: 10–12. 1921.—The author states that there are several varieties of citrus in Cyprus and lists 16 members of the citrus family. Cyprus has in the past participated with Sicily and southern Italy, Spain, Jaffa, and the Greek Islands in exporting oranges and lemons to northern Europe. Although Cyprus is well adapted to citrus cultivation, the latter centers mainly in 3 localities: Early oranges and mandarines in Famagusta; late oranges in Lefka; and lemons in Lapithos and Karavas. The author discusses the soils of these localities and methods of propagation, culture, etc., and states that the Cypriot orange growers plant too closely, and, where water is plentiful, irrigate too freely.—*W. Stuart.*

1102. BEVAN, W. **Notes on propagating olive trees in Italy.** Cyprus Agric. Jour. 16: 29–30. 1921.—Olive growers of northern Italy encourage the growth of suckers (close to the stem) from the roots of big olive trees. When of considerable size—about 1 inch in diameter—they are cut, low down, pruned, and cut back until 10 feet high, and planted in very deep holes filled with good, well broken earth to a depth of 2 or even 3 feet.—*W. Stuart.*

1103. BIOLETTI, FREDERIC T. **Vineyard irrigation in arid climates.** California Agric. Exp. Sta. Circ. 228. *4 p.* 1921.—The main irrigation and wetting of subsoil should take place when the vines are dormant. No part of the soil should remain muddy more than 48 hours while the vines are growing. The soil should become sufficiently dry to stop new growth several weeks before the arrival of cold weather. Young, non-bearing vines, which require less water than bearing vines, are especially sensitive to injury from excess of water soon after they are planted, and from cold weather or frost if maturing new growth late in the autumn.—*A. R. C. Haas.*

1104. CALVINO, MARIO. **Tratado sobre la multiplicación de las plantas. Parte general. [Treatise on the propagation of plants. General part.]** *864 p., illus.* Institute of Graphical Arts: Havana, 1920.

1105. ELLENWOOD, C. W. **Ten year yield record of apples.** Monthly Bull. Ohio Agric. Exp. Sta. 6: 40–45. 1921.—The article briefly states the results secured at the Ohio Station from 1910 to 1919 from 93 varieties of apples. The author gives much information in tabular form, including average date of full bloom, average date of 1st picking, average annual yield, highest and lowest annual yields, and number of crop failures of each variety.—*R. C. Thomas.*

1106. FLIPPANCE, F. **The Cohune nut.** Gardens' Bull. Straits Settlements 2: 432–435. 1921.—*Attalea Cohune* Mart. fruits in Singapore at the age of 25 years and upwards. The palm is described and its possible uses indicated.—*I. H. Burkill.*

1107. GOURLEY, J. H., AND G. T. NIGHTINGALE. **The effects of shading some horticultural plants. A preliminary report.** New Hampshire Agric. Exp. Sta. Tech. Bull. 18. *22 p., 16 fig.* 1921.—The response was somewhat different in different species and horticultural varieties, but always in the same general direction. The area of the leaves studied was increased from 0 to 200 per cent; the thickness on the other hand was greatly reduced, as much as 100 per cent in the apple. Shading intensified the green color of the leaves and rendered the surfaces distinctly glabrous. The root systems of all the herbaceous plants were materially reduced by growing the plants in shade. The flowering of practically all the herbaceous plants was modified by shading, and in some cases it was entirely suppressed. Shaded fruit trees also failed to develop flower buds as freely as unshaded ones. In the majority of species studied the shading resulted in a delay in flowering of from a few days to more than a month.—*J. H. Gourley.*

1108. HOOD, G. W. **Farm horticulture.** *2nd rev. ed., 354 p., illus.* Lea and Febiger: Philadelphia, 1921.

1109. KELSEY, HARLAN P. **Official catalog of plant names.** Florists' Exchange 50: 103. 1920.—This book, soon to be issued, is the result of an extensive piece of work by the Committee on Nomenclature, which represents the associations in the U. S. A. interested in horticultural progress. To the list of plant names which appeared in Bailey's Standard Cyclopedia of Horticulture, 1915, several thousand names have been added, many of them of herbaceous plants and many of them, which have not appeared generally in cultivation, have been newly tested at the Arnold Arboretum. Three societies (American Pomological Society, American Rose Society, and American Iris Society) have furnished complete lists of their respective plant materials. It is hoped that this list will be adopted by every horticultural society and by the U. S. Department of Agriculture for a term of years in order to standardize plant names. It is considered necessary to establish soon a Plant Registration Bureau with which proper descriptions of newly discovered or originated plants may be registered. It is recommended that the general committee, the American Joint Committee, be made permanent so that needed changes in the Catalog may be noted. It is proposed to hold the book in type so that a more complete edition may be published in about 2 years.—*Lua A. Minns.*

1110. MORRIS, ROBERT T. **Nut growing.** *vii + 236 p., 29 fig.* Macmillan Co.: New York, 1921.

1111. O'KANE, WALTER COLLINS. **Building an orchard from a city desk.** Gard. Mag. 33: 181–194. *6 fig.* 1921.—This article recounts the successful establishment of an orchard by a city man.—*H. C. Thompson.*

1112. RIVIÈRE, GUSTAVE, ET GABRIEL BAILHACHE. **Influence de la coleur des murs d'espaliers sur la hâtivité de maturité et la composition chimique des fruits des pêchers qui y sont adossés. [Influence of the color of the fruit walls on the hastening of maturity and the chemical composition of peaches trained against these walls.]** Jour. Soc. Nation. Hort. France 22: 51–54. 1921.

1113. [SCOTT, L. B.] **Nursery stock investigation of the [U. S. A.] Department of Agriculture.** Nation. Nurseryman 29[6]: 189–190. 1921.—An outline is given of recently developed

experimental work in the U. S. A. to determine means of propagating nursery stock (both fruit and ornamental), which in the past has been imported. A study is also being made of better stocks for the various tree fruits.—*J. H. Gourley.*

1114. STARK, LLOYD C. **President's address.** Nation. Nurseryman 29[9]: 162–165. 1921. —Among other activities of the American Association of Nurserymen, the work of standardizing ornamental and fruit nomenclature is described.—*J. H. Gourley.*

1115. THOMAS, P. H. **The black and red currants.** Dept. Agric. Tasmania Bull. 87. *11–13, 1 fig.* 1920.—Cultural treatment and methods of propagation are suggested. The best varieties of black currants are Carter's Black Champion, Lee's Prolific, and Black Naples, while the following red varieties have proved superior: La Versailles, Cherry, and Victoria.— The currant borer (*Ageria tipuliformia* Clerck) is the most destructive pest although certain scale insects attack the bushes.—*J. H. Gourley.*

1116. THOMAS, P. H. **The gooseberry.** Dept. Agric. Tasmania Bull. 87. *13–15, 1 fig.* 1920.

1117. THOMAS, P. H. **The loganberry.** Dept. Agric. Tasmania Bull. 87. *4–6, 1 fig.* 1920.—This fruit is being extensively grown for juices and preserves, for drying, and for making cordial.—Deep, well-drained soils capable of being maintained in a high state of cultivation are recommended. Methods of propagation, trellising, pruning, manuring, and harvesting are described. Disease and insect injury is rare, although an anthracnose sometimes attacks both canes and fruit.—*J. H. Gourley.*

1118. THOMAS, P. H. **The raspberry.** Dept. Agric. Tasmania Bull. 87. *1–4, 1 fig.* 1920.

1119. THOMAS, P. H. **The strawberry.** Dept. Agric. Tasmania Bull. 87. *7–11, 4 fig.* 1920.—Cultural methods, varieties, and handling for market are discussed.—*J. H. Gourley.*

1120. UPHOF, J. C. TH. **Der Anbau von Nüssen in Amerika. [Growing nuts in America.** Gartenwelt 25: *6 fig.* 1921.

1121. UPHOF, J. C. TH. **Die Dattelpalme im Südwesten der Vereinigten Staaten. [The date palm in the southwest of the United States.]** Tropenflanzer 24: 65–72. *1 fig.* 1921.— The author discusses the introduction of the date palm from Africa into the U. S. A., where it is now grown in Arizona and California. The propagation, pruning, and upkeep of a date palm plantation in southwestern U. S. A. are discussed, as well as artificial ripening, and the harvest of 22 varieties during 2 succeeding years.—*J. C. Th. Uphof.*

1122. UPHOF, J. C. TH. **Erfolg der Organisation des Absatzes—Obst-und Gemüseversteigerungen in Holland. [Results of organized marketing—Auctioning fruits and vegetables in Holland.]** Möllers Deutsch. Gärtnerzeitg. 35: 128–130. *2 fig.* 1920.

1123. UPHOF, J. C. TH. **Kühl und gefrier Industrie im Amerikanischen Obstbau. [Cold storage industry in American fruit growing.]** Gartenwelt 24: 375–378. *2 fig.* 1920.—A general consideration is presented of cold storage, pre-cooling, and transport in refrigerators of apples, pears, peaches, grapes, strawberries, and raspberries.—*J. C. Th. Uphof.*

1124. WARD, E. N. **Horticulture.** Agric. Gaz. New South Wales 32: 585–587. 1921. —The article gives instructions in tree planting.—*L. R. Waldron.*

1125. WELLINGTON, RICHARD. **New and noteworthy small fruits and grapes.** Canadian Hort. 44: 70–92. 1921.—A brief description is given of several promising new varieties of strawberries, raspberries, gooseberries, and grapes.—*E. F. Palmer.*

FLORICULTURE AND ORNAMENTAL HORTICULTURE

1126. ANONYMOUS. **A project for planting eighty-eight thousand miles of trees.** Amer. Nurseryman 34^3: 31–32. 1921.—The writer digests the opinions of various interested parties on the desirability of road-side planting of trees.—*J. H. Gourley.*

1127. ANONYMOUS. **A promising hardy privet.** Florists' Exchange 50: 665. *1 fig.* 1920. —According to all reports the new Ibolium privet (*Ligustrum ovalifolium* × *L. Ibota*) wintered perfectly as far north as the Arnold Arboretum, though the common California species (*L. ovalifolium*) was in many cases killed to the ground considerably south of Massachusetts. The new privet is said to be vigorously bushy in habit, quickly responsive to pruning and shaping, of graceful form if left unpruned, flowers profusely, is easily propagated, and endures transplanting at practically any season. The writer's experience with a single test plant in northern New Jersey indicates that it is beyond question hardy, vigorous, and thrifty.—*Lua A. Minns.*

1128. ANONYMOUS. **Alonsoa Warscewiczii.** Florists' Exchange 50: 1231. 1920.—Attention is called to *Alonsoa* as a brilliant flowered, easily grown annual, suitable for planting out in summer and for pot culture in winter; directions for propagating are given. The plant is related to the snapdragon, scarlet in color, the individual flowers in form not unlike those of *Nemesia.*—*Lua A. Minns.*

1129. ANONYMOUS. **National Rose Society's select list of roses, and instructions for pruning.** *121 p., illus.* National Rose Society: London, 1921.

1130. ANONYMOUS. **Nerines.** Florists' Exchange 50: 1070. 1920.—Flowers of these interesting and highly decorative plants (Amaryllidaceae), in red hues and appearing like miniature amaryllis, are becoming a feature in some markets. Nerines are autumn bloomers, many of them flowering before the foliage appears; there are a number of South African species. European growers have raised many hybrids, some of the most striking by the firm of Peter Barr.—Cultural directions are given, followed by a short list of good species and hybrids.—*Lua A. Minns.*

1131. ANONYMOUS. **New foxgloves.** Florists' Exchange 50: 159. 1920.—A new strain of foxglove (*Digitalis*) was exhibited at a recent meeting of the Royal Horticultural Society. The strain was originated by the Rev. W. Wilkes of Shirley Poppy fame. Some of the spikes were 7 feet high, with flowers proportionately large, all beautifully blotched or spotted. At present it does not appear to be in commerce, but the writer thinks that it will prove of real commercial value.—*Lua A. Minns.*

1132. ANONYMOUS. **Rapid cyclamen culture and raising of hybrids.** Florists' Exchange 50: 1070. 1920.—Wollrath & Sons, Waltham, Massachusetts, are credited with having good plants in November from a March sowing, due probably to a combination of favorable conditions.—There are many strains of cyclamen which vary considerably in rate and continuity of growth, size at flowering time, and yield of flowers. Seed has been scarce in the market in recent years, and many growers are saving their own seed.—According to the writer no cyclamen hybrids are recorded. Efforts to cross the *persicum* type and the hardy Neapolitan and others have failed. The greenhouse cyclamen is conceded to have been derived from *C. persicum*, sporting or gradual development being responsible for the new colors. Bulbs of *C. rohlfsianum*, from Tripoli—supposedly a native of the grottoes—have recently been sent to Washington by Dr. O. Fenzi, who expresses the hope that cyclamen specialists will succeed in evolving a new type combining the characters of *Cyclamen* and *Dodecatheon*. While *Cyclamen* species apparently will not cross, it is thought possible that either the greenhouse cyclamen or one of the hardy species may hybridize with *Dodecatheon*, despite the fact that the latter is not tuberous rooted.—*Lua A. Minns.*

1133. ANONYMOUS. **Thalictrum dipterocarpum.** Florists' Exchange 50: 385. 1920.—Thalictrums, though attractive, readily grow from seed, and easily cultured, are seldom seen

in cultivation. Perhaps the most interesting and important species of the genus is the Chinese *T. dipterocarpum* introduced by Veitch in 1907, creating much interest in Europe. It is totally distinct from other species, sending up tall spikes of purplish flowers. A pure white form recently received an award of merit in London; its origin was not given.—*Lua A. Minns.*

1134. Anonymous. **The double snapdragon.** Florists' Exchange 49: 1231. 1920.—The writer records the appearance of a double yellow snapdragon at the nurseries of the Wagoner Floral Co., Columbia City, Indiana; also of the development of double light pink snapdragons at the nurseries of T. D. Hefko, Marshfield, Wisconsin. The latter is said to be entirely double, similar in color to "Nelrose" but an earlier, more persistent bloomer. It ships well and does not quickly drop its lower flowers.—*Lua A. Minns.*

1135. Anonymous. **The new begonia "Peerless."** Florists' Exchange 49: 745. *1 fig.* 1920.—*Begonia socotrana* × a sport of begonia, "Mrs J. A. Peterson," was produced by J. A. Peterson & Sons, Cincinnati, Ohio. The originator says it is a sturdy grower, a continuous bloomer from October to April, holds its flowers, and is easy to propagate. It was registered Feb. 5, 1920.—*Lua A. Minns.*

1136. Anonymous. **The new hybrid begonias.** Florists' Exchange 50: 1183. 1920.—The hybrid English begonias were originated a number of years ago by John Heal of the Veitch firm and first grown in the U. S. A. 10–12 years ago by Henry Schmidt of North Bergen, New Jersey. Though of surpassing lovliness, Mr. Schmidt found that the plants cast their flowers when subjected to ordinary trade conditions. The type is partly of tuberous and *Socotrana* parentage. The Clibran firm, England, also developed a strain differing somewhat from Veitch's and, as the Veitch firm has dissolved, Clibran has alone continued the development of the type. Whether these gorgeous begonias can be classed as of true commercial value remains to be seen.—*Lua A. Minns.*

1137. Anonymous. **The newly discovered Kurume azaleas.** Florists' Exchange 49: 762. 1920.—Attention is called to a remarkable collection of about 120 Kurume azaleas (*Azalea obtusa*) at the Arnold Arboretum. This collection was purchased by E. H. Wilson from Mr. Akashi, one of the 2 noted growers of these azaleas at Kurume, Japan; the collection reached the Arboretum in April, 1919. These azaleas have been developed from the wild form found, according to tradition, on Mt. Kirishima, on its wind-swept, rocky slopes of volcanic soil at and above an elevation of 3500 feet. Many of these plants at the Arboretum are trained into low standards about 20 inches high, with flattened or convex crowns. The flowers are each about $\frac{1}{2}$–$\frac{3}{4}$ inch across, and are borne in clusters of from 2 to several at the end of every twig in such profusion as to almost completely hide the leaves. The colors are lustrous and pure,—pure white and varying from pink to rose, cerise, lavender, mauve, magenta, and deep scarlet. These azaleas were developed from the wild form by Motozi Sakamota about 100 years ago. Specialists in Kurume recognize some 250 named varieties. More than 50 kinds are quite distinct, though for practical purposes they may be reduced to 25. The Arboretum authorities state that "there is every reason to believe that they will thrive wherever *Azalea amoena* has proved perfectly hardy in the open."—*Lua A. Minns.*

1138. Anonymous. **The Shirley Poppy.** Florists' Exchange 49: 1319. 1920.—The writer comments on the recent interest in Shirley Poppies, the emblem of the American Legion. Though not ideal for cut flowers, plants given plenty of room will bloom profusely for several weeks provided seed pods are removed as rapidly as formed; the range of color is now large. Buds must be cut just as they open, the stem ends passed over a flame or dipped into boiling water, and afterwards plunged into deep vases or cans of water and allowed to remain 1–2 hours; under these conditions the flowers can be successfully shipped.—The Iceland Poppy (*Papaver nudicaule*) is a most important market cut flower in London; it is perennial and blooms for several weeks. While a native of alpine and arctic regions, it suffers from the winter dampness in northwestern U. S. A. Plants from seed sown early will flower the same season. Where not hardy, plants may be transferred to frames or houses. By judicious

handling, flowers should be available whenever needed. Hybrids from the Iceland Poppy and another species are now available. They are similar in habit to the Iceland Poppy, but taller, stronger, and hardier, without as yet, the full range of color.—*Lua A. Minns.*

1139. ANONYMOUS. **The Shirley Poppy.** Florists' Exchange 50: 159. 1920.—The giant form of hybrid Iceland Poppy previously referred to (see preceding entry) is now known as the "Sunbeam Poppy." It is easily raised from seed, is extremely vigorous, and is said to flower well in pots during the winter.—*Lua A. Minns.*

1140. ARMY, A. C. **How to know your irises.** Gard. Mag. 33: 247–249. 1921.—This gives 5 systems of classification which have been suggested by various authorities.—*H. C. Thompson.*

1141. BARNHART, P. D. **A plant conservatory which is different.** Florists' Exchange 49: 1427. *4 fig.* 1920.—The writer reports the erection by Edward L. Doheny, Los Angeles, California, of an unusual type of conservatory for tropical plants. Rain water is collected from the roof, stored in a huge tank, and later distributed (by compressed air) on the plants as a fine shower from perforated pipes extending the full length of the conservatory on both sides of the ridge. The conservatory contains many fine, and some unusual, specimen plants, among the latter 2 of an unknown species of Cycad, brought from Guatemala by the explorer, Ed. Howard, of Los Angeles.—*Lua A. Minns.*

1142. BAXTER, SAMUEL NEWMAN. **A boulevard tree planting without parallel.** Florists' Exchange 50: 1023. *1 fig.* 1920.—Roosevelt Boulevard, in Philadelphia, is a part of the Lincoln Highway between New York and Philadelphia, the former about 7 miles long and consisting of 3 driveways bordered by shrubbery and 6–8 rows of trees. The author names the shrubs as well as a score of the many tree species used. The shrubs are so selected as to furnish bloom throughout the summer. The earlier plantings of trees and shrubs have now developed sufficiently to give good effect. The whole is considered an unusual memorial to a great lover of the outdoors.—*Lua A. Minns.*

1143. BAXTER, SAMUEL NEWMAN. **Must we discard the Oriental plane tree for northern planting?** Florists' Exchange 50: 229. 1920.—The writer records observations on Oriental plane trees (*Platinus orientalis* of the trade) following the severe winter of 1919–20. In the spring many trees appeared dead or made a tardy and feeble effort to produce foliage, which withered or remained small and immature until well into summer. The fatalities were nearly 100 per cent in trees planted the autumn before,—sufficient evidence that fall planting is hazardous, and successful only if the winter following is favorable. A discussion follows regarding the nature of winter injury and susceptibility of this species.—The Oriental plane of most catalogues is really the maple leaved plane (*P. acerifolia*) rather than the true Oriental species. It is suggested that grafting on American plane stock may increase the hardiness of the Oriental species.—*Lua A. Minns.*

1144. BENNET, I. D. **The busy woman's garden book.** *334 p., illus.* Small, Maynard & Co.: Boston, 1920.

1145. BEVAN W. **Otto of rose.** Cyprus Agric. Jour. 16: 23–24. 1921.—The writer refers to accounts published on this subject in previous issues and claims that all the necessary factors, such as soil, climate, and suitability of rose culture and oil distillation to the inhabitants of Cyprus, seem favorable. This statement is followed by a review of a note in the Quarterly Summary of the Royal Botanic Society of London dealing with the traditional discovery of this delightful perfume oil.—*W. Stuart.*

1146. BURKHOLDER, C. L. **Vines for dwellings.** Gard. Mag. 33: 198–199. *2 fig.* 1921.

1147. BURKILL, I. H. **Annual report of the Director of Gardens for the year 1920.** Straits Settlements Government Gaz. [Suppl. 64.] Aug. 12, 1921.—The present is an administration report on the Botanic Gardens, Singapore, and the Waterfall Gardens, Penang.—*I. H. Burkill.*

1148. CLARKE, STEPHENSON R. **Rhododendron notes, 1918.** Rhododendron Soc. Notes 2: 24–25. 1920 [1921].—The issue contains notes on the flowering of rhododendrons, behavior under cultivation, effect of frost, and a note on the peculiarity of some species of exuding on the bud-scales a gummy secretion attracting insects, which become glued fast.—Similar horticultural notes on rhododendrons are the chief contents of the following articles in the same publication: CUTHBERT, KATHLEEN A. **Rhododendrons at Beaufront Castle, 1919** (p. 26); HEADFORT, MARQUESS OF. **Effect of the wet season on rhododendrons at Headfort** (p. 27); JOHNSTONE, GEORGE H. **Comments** (p. 28–29); LODER, GERALD W. (p. 30–31); McDOUALL, KENNETH. **Chinese rhododendron seedlings at Logan** (p. 32); MAGOR, E. J. P. **Rhododendron notes—Lamellen, 1919–1920** (p. 33–35); MAXWELL, HERBERT. **Notes from Monreith, Wigtownshire** (p. 36–37); STIRLING-MAXWELL, JOHN. **Rhododendrons at Carrour, Inverness-shire** (p. 38–39); MOORE, F. W. **Rhododendrons and shade** (p. 40); MOORE, H. ARMYTAGE. **Rhododendron australe and other notes** (p. 41); ROTHSCHILD, LIONEL DE. **Notes on my garden at Exbury** (p. 42–43); WILLIAMS, J. C. **Notes upon the Lapponicum group** (p. 49–50); two articles by BLADENSBURG, JOHN ROSS OF. **A few notes on plants at Castlewellan, Ireland** (p. 44–45) and **Effects of drought at Rostrevor** (p. 46–47). The number also contains notes on other trees and shrubs.—*Alfred Rehder.*

1149. COWPERWAITE, W. T. **Successful planting with really hardy plants.** Gard. Mag. 33: 31–34. *5 fig.* 1921.

1150. CROWELL, S. W. **A talk on bedding roses.** Florists' Exchange 50: 1119. 1920.—The writer has, during the past 25 years, tested more than 2000 varieties of bedding roses in the open ground (in Mississippi) with only a minimum amount of care and attention in order to determine the value of each variety under conditions usually encountered in the gardens throughout the country. Many varieties were found to be admirably suited, but the majority proved wholly unable to withstand the winter. Bedding roses of even robust habit require attention as to soil conditions, drainage, food, sunlight, and pruning. That a garden rose do well on its own roots is of first importance. A long list of bedding roses for the South is given, grouped under the headings: Teas, Hybrid Teas, Bourbons, China Roses, Hybrid Remontant, Rugosas and their hybrids, and Baby Roses. A shorter list is given for the small rose garden.—*Lua A. Minns.*

1151. CUNNINGHAM, MARY P. **A successful planting for "old fashioned" effect.** Gard. Mag. 33: 16–20. *8 fig.* 1921.

1152. D., H. D. **Forcing our native Cypripediums for Easter.** Florists' Exchange 50: 1063. *1 fig.* 1920.—Three native species of *Cypripedium* can be obtained from collectors of native plants at profitable prices. The dormant roots should be potted in late fall (November) and will bloom during late February, March, and April. *C. acaule*, *C. pubescens*, and *C. spectabile*—often termed *C. reginae*—are described, with detailed directions regarding culture. *C. spectabile* is considered the most beautiful of the 3.—*Lua A. Minns.*

1153. DUNBAR, JOHN. **Native hawthorns for our gardens.** Gard. Mag. 33: 102–107. *5 fig.* 1921.—The native American hawthorns are brieflly discussed including an historical sketch and a classification into species and groups, some of which are briefly described.—*H. C. Thompson.*

1154. EGAN, W. C. **Rosa rugosa and its hybrids.** Amer. Nurseryman 34[2]: 51. 1921.—A brief history is given of the various forms of this rose now in cultivation.—*J. H. Gourley.*

1155. ELDREDGE, ARTHUR G. **Native prairie flowers for our [U. S. A.] gardens.** Gard. Mag. 33: 314–317. *7 fig.* 1920.—This is a plea for the use of wild plants of the prairies; a list of those likely to dissappear is given.—*H. C. Thompson.*

1156. FARRINGTON, E. I. **Joys of suspense and discovery.** Gard. Mag. 32: 305–307. *4 fig.* 1921.—A brief discussion is presented of the season's novelties in flowers; those worthy of trial are mentioned.—*H. C. Thompson.*

1157. Farrington, E. I. **Some new plants for the window gardener.** Gard. Mag. 32: 261-262. *3 fig.* 1921.

1158. Farrington, E. I. **What's new in shrubs.** Gard. Mag. 33: 38-41. *6 fig.* 1921.

1159. Gibson, Henry. **Plants for the porch.** Gard. Mag. 33: 244-245. 1921.

1160. Gillett, Kenneth. **Native plants for rock gardens.** Florists' Exchange 49: 479, 506. 1920.—The writer notes the tendency toward the greater use of native plants for American gardens due to restrictions on importation and other causes. Though many are commonplace they can be made unusual by proper planting. A list is given of native New England plants suitable for that portion of rock garden shaded for at least a portion of the day; when such plants also thrive in the open sun that fact is mentioned. Most of the plants are briefly described, including soil and moisture requirements. Besides the more common herbaceous perennials, the list includes orchids, ferns, low evergreen plants, and trailers.—*Lua A. Minns.*

1161. Griffiths, David. **A timely hint on Easter lily handling.** Florists' Exchange 50: 763. *1 fig.* 1920.—The attention of florists growing Easter lilies for the first time is called to the necessity of handling the seedlings before winter sets in, especially from Washington, D. C., north. "There are 2 reasons for this: (1) The seedlings of this lily do not go dormant until they blossom, unless forced to do so; the young plants consequently go into the winter in vegetative condition. (2) They are necessarily shallow, having been set out as very small plants." If wanted for bloom the 1st year, the seedlings should be potted before cold weather and given the ordinary treatment for pot-grown Easter lily bulbs. Otherwise the plants should be dug before the temperature goes below 25°F., dried until the leaves pull off easily, reset in rich soil about 4 inches deep, and later in the season mulched with well-rotted manure, which should remain on the beds next season. The writer's experience with lilies in Washington proves the necessity of resetting for successful outdoor wintering.—*Lua A. Minns.*

1162. Griffiths, David. **A timely hint on lily production.** Florists' Exchange 49: 708. *1 fig.* 1920.—Carefully selected plants of great vigor and good production should be used as seed parents. Two plants, each with 4 (better 3) pods, will yield enough seed (250 or more per pod) for the average grower. Seed-producers may receive light feeding once a week from the time buds appear. Experiments at Washington D. C., show that the Easter lily is most profitably treated as an annual, 15-months-old plants yielding as good and as many flowers as 3-year, 8-9-inch bulbs; also, time and labor are conserved and disease practically eliminated. The belief is expressed that an early strain can be selected, the seed of which can be sown in frames in late autumn (germinating in April), and the seedlings planted out in May. Such plants would have 6 months in the open, after which they would be potted and forced for Easter, reducing the time for growing to 11 months and eliminating the use of the greenhouse in spring.—*Lua A. Minns.*

1163. Griffiths, David. **Growing easter lilies in the hardy garden.** Gard. Mag. 33: 107-108. *1 fig.* 1920.

1164. Hagenburger, Carl. **Substitutes for debarred blooming plants.** Florists' Exchange 50: 1121. 1920.—It appears that the Azalea is the only blooming plant whose exclusion by quarantine is very keenly felt. There are no real substitutes, the nearest approach being the French hydrangea, and it seems probable that in the near future more of these will be grown than has hitherto been the case with Azaleas. Among substitute plants, *Ardisia, Aucuba,* and *Solanum* are mentioned; it appears that large quantities of the first 2 will be grown profitably in the South. Solanums are now grown in large numbers. The following are listed and briefly described: *Erica*; *Poinsettia*; begonias of the semi-tuberous and *semperflorens* types; *Primula malacoides* and *P. obconica*; late-flowering chrysanthemums for Thanksgiving; *Cyclamen*; *Genista*; *Bougainvillea*; Marguerite; *Delphinium, Belladonna,* and roses.—*Lua A. Minns.*

1165. HATFIELD, T. D. **Raising yews from seed at Wellesley.** Gard. Mag. 33: 23–25 *9 fig.* 1921.

1166. HUDSON, LESLIE. **Annuals to fill the gaps.** Gard. Mag. 32: 249–250. *3 fig.* 1921.

1167. JOHNSTON, R. B. **Saving the red cedars for our gardens.** Gard. Mag. 32: 329–331. *4 fig.* 1921.—A brief discussion is given of the red cedar as an ornamental tree and its importance as a host for one stage of the apple rust, *Gymnosporangium Juniperi-virginianae* Schw. The writer believes that its use as an ornamental is not justified, particularly if planted near orchards.—*H. C. Thompson.*

1168. KING, LOUISA (YEOMANS). [MRS. FRANCIS KING.] **Pages from a garden note-book.** *291 p., illus.* C. Scribners Sons: New York, 1921.

1169. MITCHELL, SIDNEY B. **Irises in the California garden.** Gard. Mag. 33: 257–258. *4 fig.* 1921.

1170. STEELE, ASA. **The gardens of France.** Gard. Mag. 33: 320–325. *8 fig.* 1920.—The article deals with ornamental plantings rather than with fruits and vegetables.—*H. C. Thompson.*

1171. STEELE, FLETCHER. **Color charts for gardeners.** Gard. Mag. 33: 185–186. 1921.

1172. STILES, E. C. **Common sense in planning your grounds.** Gard. Mag. 32: 236–238. *3 fig.* 1921.—The author discusses the planning of the home grounds, including the location of the house and other buildings and the planting plan of the grounds; 3 plans are given to illustrate different arrangements.—*H. C. Thompson.*

1173. THEISS, LEWIS EDWIN. **"Under his own vine and fig tree." The productive plant as a landscape feature.** Gard. Mag. 32: 239–241. *5 fig.* 1921.—The author discusses the use of fruit trees and other fruit plants in beautifying the home grounds.—*H. C. Thompson.*

1174. UPHOF, J. C. TH. **Wenig bekannte Blütenpflanzen aus den westlichen Staaten Nordamerikas. [Little known flowering plants of the western states of North America.]** Gartenwelt 24: 317–319, 327–328. *8 fig.* 1920.—More wild species of flowering plants in western U. S. A. should be introduced in the gardens of Europe, including *Lysichitum camtschatcense* (L.) Schott., *Lathyrus splendens* Kellog, *Delphinium cardinale*, Hook., species of *Eriogonum* and *Dodecatheon*, *Eustoma Russelianum* (Hook.) Grisch, *Calochortus Kennedyi* Benth., *Erythraea venusta* Gray. For hybridization with existing garden plants *Lathyrus splendens*, *Trollius albiflorus* (Gray) Rydl, and various species of *Pentstemon* are suggested.—*J. C. Th. Uphof.*

1175. WILD, HENRY. **Dwarf evergreens for pictoral relief in border planting and bedding.** Gard. Mag. 33: 191–194. *5 fig.* 1921.

1176. WILD, HENRY. **Evergreens for hedges and screens.** Gard. Mag. 33: 124–127. *6 fig.* 1921.

1177. WILDER, LOUISE BEEBE. **Pinks for border and rock garden.** Gard. Mag. 32: 255–256. *1 fig.* 1921.

HORTICULTURE PRODUCTS

1178. BETSCHER, C. **What dahlia produces the most tubers?** Florists' Exchange 49: 635. 1920.—As a rule the Show Dahlia produces the heaviest clumps of tubers. In good soil "Bird of Passage" and "Ruby Queen" are heavy yielders. "Mrs. Chas. Turner" (decorative), "Souv. Douzan," and "Nymphae" are also very productive. In each class a few are heavy. The writer has observed that in rich soil and under similar conditions, such as length of season, all yield about the same weight.—*Lua A. Minns.*

1179. Bevan, W. **Pirina.** Cyprus Agric. Jour. 16: 37. 1921.—Pirina is a liquid product obtained from the olive. Analysis shows that it contains 5–12 per cent of oil depending on method of extraction. In its crude state it is suitable only for fuel purposes, though it is claimed that the oil, if it could be extracted, would be very useful in soap making.—*W. Stuart.*

1180. Cruess, W. V., and A. W. Christie. **Dehydration of fruits (a progress report).** California Agric. Exp. Sta. Bull. 330. *50–77.* 1921.—A table is given listing in brief form the tested methods of preparation and conditions of dehydration recommended for various fruits. These recommendations apply to the air-blast tunnel type of dehydrater, which so far has proved most satisfactory for general fruit dehydration.—Further investigations are under way, many by operators of dehydraters, on various phases of dehydration. It is fully expected, therefore, that many of the present practices may be greatly modified during the next few years, making it necessary to revise accordingly the recommendations given in the submitted table.—*A. R. C. Haas.*

1181. M[ilsum], J. N. **Crop records of oil palms.** Agric. Bull. Federated Malay States 8: 247–255. 1920 [1921].—The yield of the oil-palm, *Elaeis guineensis*, is given.—*I. H. Burkill.*

1182. Wilmore, W. W. **What dahila produces the most tubers?** Florists' Exchange 49: 706. 1920.—The author has found the following varieties heavy producers in the order named: "Earl of Pembroke," "Mrs. Chas. Turner," "Cornucopia," "A. D. Livoni," "Robert Broomfield," and "Kreimhilde." He has known the 1st to produce, from a single small tuber, clumps weighing 6–8 pounds, and thinks it probably could be made to yield 10–12 pounds on heavily fertilized soil. For root production seedlings as planting stock would be more economical than tubers, the 1st year seedlings being conspicuously heavy root producers. It is considered likely that the chemical composition of different varieties will vary as widely as it does in the sugar beet.—*Lua A. Minns.*

VEGETABLE CULTURE

1183. Addis, J. M. **Experimentos con boniatos. [Experiments with sweet potatoes.]** Rev. Agric. Com. y. Trab. [Cuba] 4: 478–479. 1921.—Yields of different varieties of sweet potatoes (*Ipomaea batatas*) and yield of plants grown from large, medium, and small potatoes of each variety are compared. In 1920 the plants from medium-sized tubers gave the larger yields in most cases.—*F. M. Blodgett.*

1184. Deshmukh, G. B. **Some tests of garden vegetables in Singapore-lettuces.** Gardens' Bull. Straits Settlements 2: 421–422. 1921.—Lettuces of different origin were cultivated comparatively with the object of ascertaining which races do best in the climate of Singapore.—*I. H. Burkill.*

1185. Gibson, Henry. **When you make your plans.** Gard. Mag. 32: 232–235. *5 fig.* 1921.—The author discusses the planning of a practical garden including vegetables, fruits, and various kinds of herbaceous and woody ornamentals. Directions and plans for the vegetable garden are given.—*H. C. Thompson.*

1186. Kruhm, Adolph. **Why dont the lettuces "head"?** Gard. Mag. 33: 113. 1921.—This article answers the question by suggesting varieties which will form heads under different temperature conditions provided the plants are properly spaced and given good cultural treatment.—*H. C. Thompson.*

1187. Vilmorin, J. de, et A. Meunissier. **Formes diverses de haricots d'Espagne. [Diverse forms of Spanish beans.]** Jour. Soc. Nation. Hort. France 22: 131–134. 1921.—The variability of the Spanish bean (*Phaseolus multiflorus*), which is grown as an ornamental climber in France, is discussed. Discriptions are given of various forms which have originated by accidental crossing with the common bean. From a black-seeded variety 10 distinct colors appeared in the 2nd year and at least 40 forms could be recognized.—*H. C. Thompson.*

MORPHOLOGY, ANATOMY AND HISTOLOGY OF VASCULAR PLANTS

E. W. SINNOTT, *Editor*

(See also in this issue Entries 1017, 1040, 1042, 1094, 1285)

1188. COSTANTIN, J. **Note sur les collections micrographiques de la chaire de botanique (organographie et physiologie).** [Note on the micrographic collections of the chair of botany (organography and physiology).] Bull. Mus. Hist. Nat. [Paris] 26: 336. 1920.—The collection of anatomical preparations of the laboratory of organography and physiology contains over 40,000 sections; these are principally of phanerogams. About 7,500 are of fossil plants.—*E. B. Payson.*

1189. COSTERUS, J. C. **Dialyse du pistil de Rhododendron sp.** [Dialysis of the pistil of Rhododendron sp.] Recueil Trav. Bot. Néerland. 18: 231–235. *1 pl.* 1921.—An instance of dialysis in *Rhododendron* is recorded.—*J. C. Th. Uphof.*

1190. HABERLANDT, GOTTLIEB. **Physiologische Pflanzenanatomie.** [Physiological plant anatomy.] *5th ed., rev. and enlarged, 670 p.* Leipzig, 1918.

1191. LONGO, B. **Ricerche sul melo "senza fiori" (Pyrus apetala Münch.).** [Investigation of an apple "without flowers."] Atti R. Accad. Lincei Roma Rendiconti (Cl. Sci. Fis. Mat. e Nat.) 29^2: 290–291. 1920.—This plant was found to have minute pistilliferous flowers. The flowers are not pollinated, not being visited by insects, but give rise to fruit without seeds. The case is thus interpreted as one of true parthenocarpy. The ovaries contained ovules. Trials at pollination succeeded, and seeds developed.—*F. M. Blodgett.*

1192. PETRI, L. **Sulle cause di arresto di sviluppo dell' ovario nel fiore dell' olivo.** [On the cause of the arrested development of the ovary in the flower of the olive.] Atti R. Accad. Lincei Roma Rendiconti (Cl. Sci. Fis. Mat. e Nat.) 29^1: 472–477. 1920.—The author disagrees with the conclusions of Pirotta [see Bot. Absts. 6, Entry 133], who groups olives into 4 classes depending on the presence or absence of reduction in stamens or pistil or both. He cites one of his previous publications to show that reduction of the pistil depends on surrounding conditions, particularly on water supply to the tree or branch, and that the reduction of floral parts varies in the same tree from year to year and in different parts of an orchard or tree according to conditions.—*F. M. Blodgett.*

1193. PROUTY, W. F. **A more phenomenal shoot.** Science 54: 170. 1921.—Another shoot [see Bot. Absts. 10, Entry 1196] from *Paulownia tomentosa* is here reported to have made a seasonal growth in 1920 of 21 feet 6 inches, with 24 internodes and a basal circumference of 10 inches.—*C. J. Lyon.*

1194. PROVASI, T. **Contributo allo studio dei nettarostegi.** [Contribution to our knowledge of nectar-protecting devices in flowers.] Nuovo Gior. Bot. Ital. 27: 154–206. 1920.—A review is presented of previous work on the subject of nectar-protecting devices, followed by the author's own investigation. The morphological classification of these "Saftdecken" reveals many types commonly observed in various plant families, notably the Labiatae, Borraginaceae, Scrophulariaceae, Solanaceae, and others. He sums up his general observations of the morphology and anatomy of these structures and lists the names of the plants studied and the classes to which they belong.—*Ernst Artschwager.*

1195. SEARS, PAUL B. **Variation in Taraxacum.** Science 53: 189. 1921.—"Degree of leaf dissection is correlated with the age of a given rosette," older plants having leaves more dissected. If they appear to have smooth, entire leaves, upon examination it will be found that such leaves grow from younger branches.—*C. J. Lyon.*

1196. WELLS, B. W. **A phenomenal shoot.** Science 54: 13–14. 1921.—A shoot from a trunk of *Paulownia tomentosa* (Thunb.) Stend. grew to the length of 19 feet 5 inches in 1 season (1919). [See also Bot. Absts. 10, Entry 1193.]—*C. J. Lyon.*

MORPHOLOGY AND TAXONOMY OF ALGAE

E. N. TRANSEAU, *Editor*
L. H. TIFFANY, *Assistant Editor*

(See also in this issue Entries 948, 970, 977, 1247, 1348, 1358, 1393)

1197. BUSCH, W. **Beitrag zur Kenntnis der Coccolithophoridae. [Contribution to our knowledge of the Coccolithophoridae.]** Arch. Naturgesch. Abt. A 85: 50–54. *Fig. 1–2.* 1919 [1920].—Descriptions of *Syracosphaera atlantica* n. sp. (*S.* spec. Lohmann?) and *Coccolithophora leptopora* (Muw. & Blackm.) Lohmann are presented.—*C. E. Allen.*

1198. GLEISBERG, WALTHER. **Beitrag zur Algenflora des Proskauer Teichgebietes. [Contribution to the algal flora of the Proskau group of ponds.]** Ber. Deutsch. Bot. Ges. 38: 199–207. *Fig. 1–2.* 1920.—A list of Desmidiaceae and Protococcales collected by the author, and of additional members of the same groups reported by Kirchner, in a group of ponds near Proskau is presented together with brief notes on the ecology of the ponds and on several new varieties.—*R. M. Holman.*

1199. JØRSTAD, IVAR. **Undersøkelser over zygoternes spiring hos Ulothrix subflaccida Wille. [Investigations on the germination of zygotes of Ulothrix subflaccide.]** Nyt. Mag. Naturvidenskab. 56: 61–68. *Fig. 1–25.* 1919.—Jørstad has described the germination of the resting spores of *Ulothrix subflaccida*, a marine member of the genus. He reviews the work of Dodel and Klebs on the fresh water species, *Ulothrix zonata.* According to Dodel, the contents of the zygote, after a relatively long period, divides into 2–14 non-motile cells, each showing an eye-spot and an organ for attachment. Klebs observed in cultures the formation of "zygotes" with and without conjugation. In about a month both kinds germinated readily, producing 2–4 non-motile cells without eye-spot. Further, no organ of attachment was observed. Klebs suggested that the resting cells which germinated by forming 2 cells were non-sexual while the others, producing in germination 4 cells, were formed by the fusion of gametes.—Jørstad's observations agree in the main with those of Dodel. He describes the resting cells or zygotes as generally spherical, sometimes egg-shaped, frequently with an attachment organ, and very variable in size. On germination the contents divides into a considerable number of cells, as many as 14, depending upon the size of the zygote. These cells are non-motile, have no eye-spot, and the chromatophore can not be readily seen, although the pyrenoid is evident. The cells may form new filaments before escaping from the zygote wall.—*A. Gundersen.*

1200. ROSE, M. **Recherches biologiques sur le plankton. [Biological researches on plankton.]** Bull. Inst. Oceanograph. Monaco 385. *16 p.* 1921.—The work was done with copepods, but the methods are of interest in that they may be largely paralleled by workers on phytoplankton.—*T. C. Frye.*

1201. SAUVAGEAU, CAMILLE. **Observations biologiques sur le Polysiphonia fastigiata, Grev. [Biological observations on Polysiphonia fastigiata.]** Recueil Trav. Bot. Néerland. 18: 213–230. *Fig. 6.* 1921.—*Polysiphonia fastigiata* is not an epiphyte but a parasite; the rhizoids are endophytic in character. The exclusive presence on *Ascophyllum* and *Fucus* argues for an adoption of the parasitic habit, though the species appears less on the latter than on the former. Notwithstanding its parasitic nature, the spores easily germinate in cultures and form small plants.—*J. C. Th. Uphof.*

1202. SCHRÖDER, BRUNO. **Schwebepflanzen aus dem Saabor-See und aus den grösseren Seen bei Liegnitz. [Phytoplankton from Saabor Lake and from the larger lakes near Liegnitz.]** Ber. Deutsch. Bot. Ges. 38: 122–135. 1920.—The author enumerates the forms collected with plankton net in 5 small Silesian lakes, presents a table of the distribution in these lakes of the 92 species found, discusses the ecology of certain of the forms, and describes new or critical organisms which were encountered. The new species are *Scenedesmus arthrodesmiforme* and

S. pseudodispar. The paper closes with a table in which Schlawa Lake, the 5 lakes discussed in the paper, and 2 ponds in the same vicinity are compared as to position, altitude, form, size, depth, number of species of different classes of algae, and ecological character.—*R. M. Holman.*

MORPHOLOGY AND TAXONOMY OF BRYOPHYTES

ALEXANDER W. EVANS, *Editor*

(See in this issue Entries 970, 983, 990, 993, 997)

MORPHOLOGY AND TAXONOMY OF FUNGI, LICHENS, BACTERIA, AND MYXOMYCETES

H. M. FITZPATRICK, *Editor*

(See also in this issue Entries 931, 932, 934, 935, 936, 954, 968, 969, 1041, 1071, 1075, 1091, 1354, 1355, 1359, 1393, and others in the section Pathology)

FUNGI

1203. ANONYMOUS. **Index to American mycological literature.** Mycologia 13: 195–199. 1921.

1204. BATAILLE, FREDERIC. **Cortinarius suaveolens Bataille et Joachim nov. sp.** Bull. Trimest. Soc. Mycol. France 36: 85–86. 1920.—The species differs from *C. calochrous* and *C. dibaphus* in having a characteristic perfume and color; it is evidently intermediate between them.—*D. S. Welch.*

1205. BOURDOT, H. **Two new Basidiomycetes.** Trans. British Mycol. Soc. 7: 50–54. *Fig. 1–2.* 1921.—*Corticium Pearsonii* and *Heterochaete crystallina* are described as new. **Heterochaetella** is erected as a new sub-genus within the genus *Heterochaete*.—*W. B. McDougall.*

1206. BOURDOT, H., ET A. GALZIN. **Hyménomycètes de France—VI. Astérostromés.** [French Hymenomycetes.] Bull. Trimest. Soc. Mycol. France 36: 43–47. 1920.—Speculations are presented as to the origin of the stellate cystidia characterizing this group. A description of the genus *Asterostroma* with 3 species and *Asterodon* with 1 species is given.—*D. S. Welch.*

1207. BOURDOT, H., ET L. MAIRE. **Notes critiques sur quelques Hyménomycetès nouveaux ou peu connus.** [Some new or little known Hymenomycetes.] Bull. Trimest. Soc. Mycol. France 36: 69–85. *1 fig.* 1920.

1208. CHENANTAIS, J. E. **Sillon et pores germinatifs.** [**Germinal ridge and pores.**] Bull. Trimest. Soc. Mycol. France 36: 29–33. *9 fig.* 1920.—The question is raised as to the value of germinal ridges in determining relationships, particularly in the Xylariaceae and *Rosellinia*. Many satisfactory relationships have been established without reference to this character. Examples of *Anthostoma*, *Hypoxylon*, and *Clypeosphaeria* show that minute spore characters are not always reliable. The germinal ridge merely indicates the manner of dehiscence in certain types of spores. On the other hand, such a structure should not be overlooked since it should serve to indicate that other more conclusive affinities may exist.—*D. S. Welch.*

1209. DUVERNOY, A., ET R. MAIRE. **Une nouvelle Dématiée à conidies pseudo-endogenes.** [**A new form of the Dematiaceae with pseudo-endogenous conidia.**] Bull. Trimest. Soc. Mycol. France 36: 86–89. *6 fig.* 1920.—**Endophragmia** nov. gen. ad interim is described with *E. mirabilis* n. sp. ad interim as the type. A peculiar method of conidia formation is described. The 1st spore forms at the tip of a conidiophore in a perfectly normal way. The 2nd forms

inside a collar left by the 1st. After being raised on a short stalk it is discharged, leaving another collar above the 1st.—*D. S. Welch.*

1210. ELLIOTT, JESSIE S. BAYLISS, AND HELENA C. CHANCE. **Three fungi imperfecti.** Trans. British Mycol. Soc. 7: 47–49. *Fig. a–b.* 1921.—**Cytotriplospora** *Pini* is described as a new genus and species. The other 2 fungi discussed are *Naemospora Strobi* Allescher and *Fusicoccum bacillare* S. & P.—*W. B. McDougall.*

1211. FERDINANDSEN, C., ET Ø. WINGE. **Uromyces Airae-flexuosae sp. nov.** Bull. Trimest Soc. Mycol. France 36: 162–164. *Fig. 1–2.* 1920.—The authors find teleutospores of a *Uromyces* associated with the well-known *Uredo Airae-flexuósae*, and accordingly establish *Uromyces Airae-flexuosae* sp. n.—*D. S. Welch.*

1212. FRON, ET LASNIER. **Sur une Chytridinée parasite de la luzerne.** [**A chytrid parasitic on alfalfa.**] Bull. Trimest. Soc. Mycol. France 36: 53–61. *Pl. 5, 3 fig.* 1920.—*Urophlyctis Alfalfae* produces tumors or hypertrophies on alfalfa, affecting only the aerial parts. It is widespread in distribution and probably one of the causes of premature withering of alfalfa. The parasite develops within the tissue of the host. "Resting sporangia" are produced. There is a slight development of mycelium which aids in spreading the infection. No true mitosis is observed nor anything suggesting sexuality.—*D. S. Welch.*

1213. GONZÁLES FRAGOSA, R. **Quelques mots sur une nouvelle Lophiostomacée.** [**Remarks on a new member of the Lophiostomataceae.**] Bull. Trimest. Soc. Mycol. France 36: 103–106. *Fig. 1–2.* 1920.—A description is presented of *Lophiotrema Pteridis* f. n. ad interim on fronds of *Pteris aquilina.*—*D. S. Welch.*

1214. GUILLIERMOND, A. **Zygosaccharomyces Pastori, nouvelle espèce de levures à copulation hétérogamique.** [**A new heterogamic species of yeast.**] Bull. Trimest. Soc. Mycol. France 36: 203–211. *Pl. 11–13, 1 fig.* 1920.—Another addition to the growing list of heterogamic yeasts is described. The morphological and cultural characters of *Zygosaccharomyces Pastori* n. sp. are given.—*D. S. Welch.*

1215. GUILLIERMOND, A., ET PEJU. **Une nouvelle espèce de levures du genre Debaryomyces, D. Klöckerii, n. sp.** [**A new species of yeast.**] Bull. Trimest. Soc. Mycol. France 36: 164–171. *Pl. 6–10.* 1920.—A detailed description of the morphological and cultural characters of a new species of yeast is given. This form, *Debaryomyces Klöckerii* n. sp., is of unusual interest since it appears to be a form intermediate between the Saccharomycetaceae and the Endomycetaceae.—*D. S. Welch.*

1216. JOHNSTONE, R. B. **Audibility of the spore discharge in Otidea leporina.** Trans. British Mycol. Soc. 7: 86. 1921.—The puffing of *Otidea leporina* was found to be accompanied by a hissing sound that could be distinctly heard at a distance of 6 feet.—*W. B. McDougall.*

1217. KOBEL, FRITZ. **Zur Biologie der Trifolien-bewohnenden Uromycesarten.** [**Biology of the forms of Uromyces on Trifolium.**] Centralbl. Bakt. II Abt. 52: 215–235. 1920.—A morphologic and biologic study of the autoecious species of Uromyces on clover is presented. The biologic species were found to be of rather wider range than usually described. Studies on the sculpturing, size, and form of the teleutospores would indicate that the species consist of a conglomerate of races.—*M. A. Raines.*

1218. LAUBERT, R. **Schmarotzer Pilze und Pflanzenkrankheiten aus Polen und Masuren.** [**Parasitic fungi and plant diseases from Poland and Masuria.**] Centralbl. Bakt. II Abt. 52: 236–244. 1920.—The author presents a classified list of parasitic fungi collected while serving in the army 1915–1918.—*Anthony Berg.*

1219. LLOYD, C. G. **Mycological Notes No. 62.** 904–944. *Fig. 1598–1747.* 1920.—A portrait of J. C. Arthur appears on the cover and is followed in the text by a chronological arrange-

ment of the chief events in his life.—The body of the publication contains, among other things, the following species described as new: *Lenzites abietis*, Colorado; *Irpex crassitatus*, Iowa; *Calocera palmata*, Massachusetts; *Aleurodiscus grantii*, Washington; *A. crassus*, Oregon; *Exidia zelleri*, Oregon; *Polyporus peakensis*, Colorado; *Laschia chippii* and *Xylaria kedahae*, Straits Settlements; *Cordyceps rickii* and *Isaria myrmicidae*, Brazil; *Hydnum pulcher*, *Polyporus arenosobasus*, *Dacryomyces australia*, and *Aleurodiscus capensis*, South Africa; *Fomes longoporus* and *F. gossweileri*, Portuguese West Africa; *Dendrocladium fruticola*, *Polyporus fuscatus*, *P. biogilvus*, *P. vandykei*, and *Fomes durissimus*, Africa; *Isaria cocoa*, Philippines; *Aleurodiscus orientalis*, Japan; *Daedalea ridleyi*, Singapore; *Cordyceps aponae* and *Auricula totarae*, New Zealand; *Polyporus molliculus*, Ceylon; and *P. pseudogilvus*, Cuba.—Notes on the following genera are more or less monographic: *Aleurodiscus*, *Cordyceps*, *Poronia*, and *Thamnomyces*. A considerable number of notes on other genera are also included.—The plant that has passed in American mycology as *Sebacina dendroidea* is now referred to *Institale bombacina* of the Fungi Imperfecti.—*L. O. Overholts.*

1220. LLOYD, C. G. **Mycological Notes No. 63.** 945–984. 1920.—The number is given over almost entirely to listing collections received, with occasional notes. Announcement is made that hereafter material previously noted in the "Letters" will be included in "Mycological Notes;" The Letters thus end with No. 69.—The present issue lists collections received from correspondents in various parts of the U. S. A., from France, Cuba, Java, South Africa, Mexico, India, Africa, Bahamas, Brazil, New South Wales, Singapore, Australia, Jamaica, New Zealand, Hawaii, West Africa, Japan, Denmark, Barbados, Ceylon, England, Tasmania, Belgian Congo, East Africa, Guam, and Scotland.—New species are described as follows: *Geaster caespitosus*, Missouri; *Merulius carbonarius*, Washington; *Irpex pallidus*, Bahamas; *Hexagona umbrosus*, Singapore; *Lycoperdon tephrum*, Africa; *Polyporus multisetosus*, Australia; and *P. verecundus*, Guam.—The usual number of miscellaneous notes on various genera are included.—*L. O. Overholts.*

1221. LLOYD, C. G. **Mycological Notes No. 64.** 985–1029. *Fig. 1748–1859.* 1920.—The cover carries a portrait of the late G. W. Clinton, of Buffalo, New York, together with a short biographical account.—New species are described as follows: *Exidia beardsleei*, North Carolina; *Tylostoma mohavei*, California; *Polystictus rarus*, South Carolina (?); *Stereum incisum*, *S. cuneoforme*, *Kretzschmaria botrites*, *Laschia similis*, *Polystictus bicolor*, *P. pallidus*, *P. anomalosus*, *Polyporus cystididoides*, *P. ater*, *P. acervatus*, *Hydnum ferreus*, *H. maliensis*, and *Hexagona angulata*, Singapore; *Polystictus subcaperatus* and *Podaxon anomalum*, Australia; *Thelephora penicillata*, *Tremella microspora*, and *Cytidia simulans*, South Africa; *Ptychogaster niger*, West Africa; *Polyporus angolensis*, *Polystictus luteo-affinis*, and **Phyllotremella** (nov. gen.) *africanus*, Africa; *Polystictus cuneato-brunneus*, *Fomes magnosporus*, and *Hexagona ferruginosa*, Philippines.—In addition, specimens of fungi are recorded as having been received from various parts of the U. S. A., from India, South Africa, France, Canada, Singapore, Holland, Chile, Japan, New Zealand, England, Philippines, Ecuador, Zanzibar, Brazil, Jamaica, Cuba, and Africa. The usual number of miscellaneous notes on species of various genera are included.—*L. O. Overholts.*

1222. LLOYD, C. G. **Mycological Notes No. 65.** 1029–1101. *Fig. 1859–2018.* 1921.—The usual cover page is given over to a photograph of Oreste Mattirolo, the Italian mycologist, and a short biographical sketch follows. A smaller portrait of Rev. F. Theiszen is also presented, together with a notice of his death.—New species are described as follows: *Melanogaster mollis*, Wyoming; *Merulius erectus*, Minnesota; *Tremellodendron hibbardii*, Massachusetts; *Tremella carneo-alba*, North Carolina; *Hypoxylon magnosporum*, New Jersey; *Lycoperdon globosepiriforme*, Colorado; *Hydnangium pallidum*, *Trametes rugoso-picta*, *Merulius ochraceus*, and *Aleurodiscus scopulatus*, Ecuador; *Podocrea transvaalii* and *Tylostoma transvaalii*, South Africa; **Dubiomyces** (nov. gen.) *viridis*, Jamaica; *Polyporus flabellaris*, *P. superniger*, *P. oroniger*, *P. armadillus*, *P. ramosii*, *P. melanoporus*, *Trichoscypha magnispora*, *Podocrea anomala*, *Xylaria divisa*, X. *timorensis*, *Stereum auriscalpium*, *S. felloi*, *Pterula incisa*, and **Phyllomyces** (nov. gen.) *multiplex*, Philippines; *Polystictus albobadius*, *Polyporus sepiae*,

and *P. burkillii*, Singapore; *Stereum* (*Hymenochaete*) *speciosum*, Porto Rico; *Trametes versicolor*, Chile; *Hypoxylon rostratum*, *Diploderma cretaceum*, *Trametes subminima*, *Polystictus radiato-rugosus*, and *Lentinus atro-lucidus*, Tasmania; *Xylaria composita*, West Africa; *Cordyceps thwaitsii*, Ceylon; *C. hillii*, New Zealand; *Fomes latistipitatus*, **Phyllocarbon** (nov. gen.) *yasudai*, *Aleurodiscus tsugae*, *A. stereoides*, and *Polyporus juxta-rugosus*, Japan; *Ptychogaster aureus* and *Polyporus victoriensis*, Australia; *Polyporus duroporus*, China; *Trametes guatemalensis*, Guatemala.—Notes on the genera *Kretzschmaria* and *Melanogaster* are more or less monographic. Miscellaneous notes on other genera are included.—Specimens are recorded as being received from various parts of the U. S. A., from Canada, India, South Africa, Bahamas, France, Switzerland, Porto Rico, Singapore, Australia, Fiji Islands, Holland, New Zealand, China, Syria, Philippines, Borneo, Sumatra, Belgium, Italy, Ecuador, Zanzibar, Brazil, Tasmania, and Belgian Congo.—*L. O. Overholts.*

1223. MANGIN, L., ET F. VINCENS. **Sur un noveau genre d'Adelomycetes, le Spirospora Castaneae n. sp. [A new genus of Adelomycetes.]** Bull. Trimest. Soc. Mycol. France 36: 89–97. *Fig. 1–7.* 1920.—A new fungus has been discovered in examining chestnuts affected with black-rot. The organism seems to belong near *Mycogone* in the Adelomycetes; the new genus **Spirospora** is established and the single species *S. Castaneae* described. The note states that the word Adelomycetes has been previously suggested by one of the authors to replace the expression Fungi Imperfecti.—*D. S. Welch.*

1224. MAUBLANC, M. **Contribution à l'étude de la flore mycologique brésilienne. [Contribution to the flora of Brazil.]** Bull. Trimest. Soc. Mycol. France 36: 33–43. *Pl. 2–4, fig. 1–11.* 1920.—The present article begins a series on fungi collected by the author in Brazil (1912–14). Under the heading. "I. Fungi Novi Braziliensis," appear descriptions of the following: *Dimeriella caracaensis* n. sp.; *Sphaerella ilicicola* n. sp.; *Metasphaeria stromaticola* n. sp.; *Leptosphaeria paraguariensis* n. sp.; *Nectria badia* n. sp.; **Uropolystigma** (n. gen. Nectriaceae) *atro-testaceum* n. sp.; *Calonectria coralloides* n. sp.; *Giberella longispora* n. sp.; *Asterina Maublancii* (Arnaud) nob.; *Dimerosporium Triumfettae* Arn.; *Maublancia Myrtacearum* Arn.; *Morenonia inaequalis* Maubl.; *Pestalozzia paraguariensis* n. sp.; *Cercospora Byrsonimatis* n. sp.; *Cercospora ilicicola* n. sp.; *Cercospora Trigonellae* n. sp.; *Gibellula arachnophila* (Ditm.) Vuill. forma *macropus n. f.*—*D. S. Welch.*

1225. MAYOR, EUGENE. **Étude experimentale du Puccinia Opizii Bubak. [On Puccinia Opizii Bubak.]** Bull. Trimest. Soc. Mycol. France 36: 97–100. 1920.—Experiments verify the results of Bubak, Tranzschel, and Arthur, and demonstrate that *Puccinia Opizii* is able to develop aecidia on the following composites: *Lactuca canadensis*, *L. muralis*, *L. perennis*, *L. sativa*, *L. scariola*, *L. virosa*, *Crepis biennis*, *C. taraxacifolia*, *C. virens*, *Lampsana communis*, *Sonchus arvensis*, *S. asper*, *S. oleraceus*. Uredo- and teleutospores develop on *Carex muricata* and *C. siccata* in the U. S. A. The following composites were found to be immune: *Aposeris foetida*, *Centaurea Jacea*, *C. Rhaponticum*, *Crepis aurea*, *C. blattarioides*, *C. foetida*, *C. mollis*, *C. paludosa*, *Cirsium palustra*, *Erigeron acer*, *Hypochoeris radicata*, *Senecio aquaticus*, *S. Jacobaea*, *S. Fuchsii*, *S. silvaticus*, *Taraxacum officinale*.—*D. S. Welch.*

1226. MIRANDE, ROBERT. **Zoophagus insidians Sommerstoff, capteur de rotifèrs vivants. [A captor of living rotifers, Zoophagus insidians.]** Bull. Trimest. Soc. Mycol. France 36: 47–53. *5 fig.* 1920.—This organism, probably a member of the Saprolegniaceae, is parasitic upon certain aquatic animals, especially rotifers. Short branches of the filaments apparently produce an adhesive substance at the tip. These tips come in contact with the oral cavity of animals seeking food; the animal is effectively caught. The fungus develops abundantly within the body of the animal killing and digesting it, only the chitinous parts remaining. Only one other case is known, that of *Arthrobotrys oligospora* (Zopf), of a fungus able to capture living animals of a relatively higher organization.—*D. S. Welch.*

1227. MOREAU, F. **A propos du noveau genre Kunkelia Arthur. [A propos of the new genus Kunkelia of Arthur.]** Bull. Trimest. Soc. Mycol. France 36: 101–103. 1920.—Attention is

called to the recent work of Arthur establishing the new genus *Kunkelia* on the short-cycled rust occurring on *Rubus* in a form similar to *Caeoma nitens*. The geographical distribution of this form is contrasted with that of the long-cycled form, *Gymnoconia interstitialis* (Schlecht.) Lagerheim. The latter is found in colder regions and at higher altitudes. These results are in accord with the theory of M. and Mme. Moreau that the short-cycled Uredineae have been derived from those of a longer life-cycle by the loss of the resting spore stage following emigration to a warmer climate.—*D. S. Welch.*

1228. PARISI, ROSA. **Di alcuni parassiti delle piante medicinali e da essenze.** [Some parasites of medicinal and essence-producing plants.] Riv. Patol. Veg. 11: 1–16. 1921.—Ten fungous parasites are listed and described of which 2 are new species, namely, *Macrosporium Papaveris* on the capsules of *Papaver somniferum* and *Macrosporium Cavarae* on the foliage of *Ricinus communis*. *Septoria Melissae* Desmazières is transferred to the genus *Phleospora*.—*F. M. Blodgett.*

1229. PATOUILLARD, N. **Le genre Clavariopsis Holt.** [The genus Clavariopsis.] Bull. Trimest. Soc. Mycol. France 36: 61–63. *2 fig.* 1920.—This genus was established by Holtermann for the Clavaria-like species of the genus *Tremella*. Three species are listed: *C. pinguis* Holt. type, from Java; *Tremella damaecornis* Moller from Brazil; *C. pulchella* Pat. and Har. from New Caledonia. A new species, *C. prolifera*, is described from the Philippines.—*D. S. Welch.*

1230. PATOUILLARD, N. **Quelques champignons du Tonkin (suite) (1).** [Some fungi of Tonquin.] Bull. Trimest. Soc. Mycol. France 36: 174–177. 1920.—Fifteen species are described, of which the following are new: *Septobasidium carbonaceum*, *Helicobasidium purpureum* (Tul.) Pat. var. *orientale*, *Spongipellis Eberhardti*, and *Sphaerella Mycopron*.—*D. S. Welch.*

1231. PEARSON, A. A. **New British Hymenomycetes.** Trans. British Mycol. Soc. 7: 55–58. 1921.—Besides descriptive notes on 8 other species, 1 new variety, *Hypochnus roseogriseus* Wakef. & Pearson var. *lavandulaceus*, is included.—*W. B. McDougall.*

1232. PETCH, T. **Presidential address. Fungi parasitic on scale insects.** Trans. British Mycol. Soc. 7: 18–40. 1921.—The earliest record of a fungus parasitic on a scale insect was made in 1848 by Desmazières, who collected specimens in Normandy growing on scale insects on willow and ash. This fungus was a conidial form and was named *Microcera coccophila*. Later the perithecial stage was collected by Berkeley in America and named *Sphaerostilbe flammea* by the Tulasnes. Later 2 other species of *Sphaerostilbe* were shown to be parasitic on scale insects. In Europe all 3 species are rare and very poorly developed, especially in the Microcera stage, as compared with specimens collected in the tropics. The name *Microcera* has been used for any conidial fungus with Fusarium spores which grows on a scale insect, but there are 2 common types which differ from each other generically. One of these, the true *Microcera*, falls in the Stilbaceae. The other belongs to the Tuberculariaceae, and for this the author proposes to establish a new genus, **Pseudomicrocera**. A 3rd type which proved to be neither *Microcera* nor *Pseudomicrocera* was collected in 1904 in Australia by McAlpine. For this the author proposes a new genus, **Discofusarium**. A new genus name, **Podonectria**, is proposed for 3 species of scale insect fungi which are characterized by the possession of multiseptate ascospores and a Tetracrium conidial stage. In the genera *Cordyceps* and *Torrubiella* the number of species recorded as occurring on scale insects is comparatively small, respectively 3 and 4, and very little is known about some of them. All species of *Aschersonia* are entomogenous and occur for the most part on scale insects. The perithecial stage of *Aschersonia* is *Hypocrella* and it also is entomogenous. One species of *Empusa* and several of *Septobasidium* are known to occur on scale insects. Some species of *Septobasidium* after destroying the scale insects become parasitic on the host plant. Several species of Hyphomycetes have been recorded as parasitic on scale insects. About 10 species of endoparasites of scale insects have been described, mostly belonging to the Saccharomycetes.

Entomogenous fungi destroy enormous numbers of scale insects and for this reason numerous attempts have been made, notably in Florida, to control scale insect pests by means of these fungi. After 30 years trial, however, "there is no instance of the successful control of any insect by means of fungus parasites." [See also following entry.]—*W. B. McDougall.*

1233. Petch, T. **Studies in entomogenous fungi. 1. The Nectriae parasitic on scale insects.** Trans. British Mycol. Soc. 7: 89–132. 1921.—This paper is to be continued in the next part of the Transactions. The present installment includes a historical summary and an account of the genus *Microcera*, of a new genus, **Pseudomicrocera**, and of the genus *Sphaerostilbe.* [See also preceding entry.]—*W. B. McDougall.*

1234. Peyronel, B. **La forma ascofora della Rhacodiella castaneae, agente del nerume delle castagne. [The ascospore form of Rhacodiella castaneae, cause of the black rot of chestnuts.]** Atti R. Accad. Lincei Roma Rendiconti (Cl. Sci. Fis. Mat. e Nat.) 29^2: 324–327. 1920. —The perfect stage of *Rhacodiella castaneae* proved to belong in the genus *Sclerotinia* and was classified provisionally as *S. pseudotuberosa* Rehm. A description is given.—*F. M. Blodgett.*

1235. Ramsbottom, J. **Californian bees.** Trans. British Mycol. Soc. 7: 86–88. 1921.— "Californian bees" is one of several local names for the ginger-beer plant, which is made up of 2 organisms, a yeast, *Saccharomyces pyriformis*, and a bacterium, *Bacterium vermiforme*, living together symbiotically. It is considered probable that both organisms are benefited by the symbiosis, the bacterium obtaining metabolic substances given off by the yeast cells and the yeast benefited by removal of these same substances.—*W. B. McDougall.*

1236. Ramsbottom, J. **The Minehead foray.** Trans. British Mycol. Soc. 7: 1–10. 1921. —The 24th annual meeting and autumn fungus foray which took place at Minehead, Oct, 2, 1920, are reported and a complete list of the fungi collected, numbering about 530 species is given.—*W. B. McDougall.*

1237. Rea, Carleton. **New or rare British Discomycetes.** Trans. British Mycol. Soc. 7: 58–61. 1921.—Besides descriptive notes on 5 other species, *Pustularia lecithina* (Cke.) is included as a new combination and *Niptera Taxi* is described as new.—*W. B. McDougall.*

1238. Saccardo, P. A. **Fungi Sinensis aliquot a cl. Prof. Otto A. Reinking collecti et communicati. [Some Chinese fungi collected and arranged by Prof. Otto A. Reinking.]** Philippine Jour. Sci. 18: 595–605. 1921.

1239. Saccardo, P. A. **Micetes Boreali Americani. [North American fungi.]** Nuovo Gior. Bot. Ital. 27: 72–88. 1920.—A list is given of fungi collected by J. R. Weir.—*Ernst Artschwager.*

1240. Snell, Walter H. **Chlamydospores of Fomes officinalis in nature.** Phytopathology 11: 173–174. *Fig. 1.* 1921.—Chlamydospores, similar to those produced in cultures, were found on specimens of wood decomposed by *Fomes officinalis.* Attempts to germinate the chlamydospores failed.—*B. B. Higgins.*

1241. Vuillemin, Paul. **Nouvelles souches thermophiles d'Aspergillus glaucus. [Thermophilic forms of Aspergillus.]** Bull. Trimest. Soc. Mycol. France 36: 127–136. *Fig. 1–3.* 1920.—Strains of *Aspergillus* have been found capable of growing at a maximum temperature of 38°C. Two of these, *Eurotium Amstelodami* and *E. Chevalieri*, were described as new species by Mangin. Cultural studies have been made upon pathogenic forms of *Aspergillus* from which the author concludes that the above mentioned species are but varieties of *Eurotium repens.* He suggests the following names: *Eurotium repens* var. *Amstelodami* and *E. repens* var. *Chevalieri.*—*D. S. Welch.*

1242. Wainio, E. A. **Lichenes Insularum Philippinarum III.** Ann. Acad. Sci. Fennicae 15: 1–368. 1921.—Two genera of fungi are described, **Melaspileela** (Karst.) Wainio, with 2

species, 1 being new, and Didymosphaeria Sacc., with 3 new species. [For abstract of entire paper see Bot. Absts. 10, Entry 1249.]—*H. M. Fitzpatrick.*

1243. WHITEHEAD, T. **On the life history and morphology of Urocystis cepulae.** Trans. British Mycol. Soc. 7: 65–71. *Pl. 2.* 1921.—*Urocystis cepulae*, which causes a destructive smut disease of onions, has a relatively simple life history, chlamydospores giving rise to promycelia which develop sporidia laterally. Infection probably takes place through root hairs in the collar region of seedlings.—*W. B. McDougall.*

1244. WILSON, MALCOLM. **Notes on new or rare British fungi.** Trans. British Mycol. Soc. 7: 79–85. 1921.—This paper contains notes on *Dasyscypha calyciformis* (Willd.) Rehm, *Hypoderma pinicola* Brunch, *Hypoderma brachysporum* (Rostr.) Tub., *Cronartium ribicola* F. de Waldh., *Melampsorella caryophyllacearum* Schröt., *Hapalosphaeria deformans* Syd., *Melasmia empetri* Magn., *Botrytis douglasii* Tub., and seven species of *Puccinia.*—*W. B. McDougall.*

LICHENS

1245. KNIGHT, H. H. **The lichens of Minehead district.** Trans. British Mycol. Soc. 7: 16–18. 1921.—A list is given of about 146 species of lichens collected in the vicinity of Minehead, Somersetshire, during the autumn foray of 1920. Three fungus parasites on lichens were found.—*W. B. McDougall.*

1246. MERESCHKOVSKY, C. **Diagnoses of some lichens.** Ann. and Mag. Nat. Hist. 8: 246–290. *Fig. 1–2.* 1921.—The author gives Latin diagnoses of a large number of lichens which he has previously described in Russian and French. In some cases the descriptions are brief, the collections and notes having been left in Russia. Some corrections are made to his preceding paper (see Bot. Absts. 8, Entry 479).—*H. H. Clum.*

1247. PAULSON, ROBERT. **The sporulation of gonidia in the thallus of Evernia prunastri Ach.** Trans. British Mycol. Soc. 7: 41–47. *Pl. 1.* 1921.—"The gonidium does not multiply vegetatively as a constituent of the lichen thallus, but the original protoplast of the mother cell divides into 2, 4, 8, or 16—sometimes more—distinctly separate wall-less masses. Each of these masses rapidly secretes a cell-wall, develops a chloroplast and nucleus and, in a short time, resembles exactly, in miniature, the mother cell as it appeared before it commenced to sporulate. The mother cell-wall, either by becoming difluent or by bursting, sets free the daughter cells."—*W. B. McDougall.*

1248. PAULSON, ROBERT. **The microscopical structure of lichens.** Jour. Quekett Microsc. Club 14:163–170. *Pl. 4, fig. 1–2.* 1920.—The gonidia of most lichens belong to a species of *Chlorella*, the cells of which do not divide vegetatively but reproduce by sporulation within the algal mother cell, much as in free *Chlorella* cells. "Penetration of living gonidia by hyphae seldom, if ever, takes place."—*L. B. Walker.*

1249. WAINIO, E. A. **Lichenes Insularum Philippinarum III.** Ann. Acad. Sci. Fennicae 15: 1–368. 1921.—This is the 3rd and concluding paper of the series, the first 2 having been published in the Philippine Jour. Sci. Bot. 4: 651–662. 1909, and 8: 99–137. 1913.—The series is largely based on the material collected by the Bureau of Science [P. I.], supplemented by some specimens secured by Elmer and Baker. Sixty-four genera containing 514 species, besides many varieties and forms, are described in the present work, of which 11 genera and 364 species as well as a great many varieties, are offered as new to science. This makes a total of 87 genera and 635 species listed by Wainio in his 3 papers on Philippine lichens. No attempt has yet been made to collect rock lichens, which are very conspicuous in many localities. Following is a list of the genera described, with the number of new species and total number of species described in each: *Arthonia* (Ach.) Wainio, 29 species (21 new); *Aspidopyrenium* Wainio, 2 species (1 new); *Asterothyrium* Müll.-Arg., 4 species, all new; *Bacidia* De Notaris, 17 species, all new; *Baeomyces* (Pers.) Mass., 7 species (2 new); *Biatorella* De Notaris, 2 species

(new); *Bilimbia* De Notaris, 14 species, all new; *Bombyliospora* Mass., 3 species; *Bottaria* (Mass.) Wainio, 13 species (9 new); **Byssolecania** Wainio, new genus with 2 species (new); *Calenia* Müll.-Arg., 7 species (6 new); *Calicium* Persoon, 1 species (new); *Catillaria* (Mass.) Wainio, 9 species (8 new); *Chiodecton* (Ach.) Wainio, 20 species (13 new); *Cladonia* (Hill) Weber, 15 species (1 new); *Coccocarpia* Persoon, 5 species (1 new); *Coenogonium* Ehrenb., 5 species (1 new); *Collema* (Hill) Fr., 4 species (1 new); *Crocynia* (Ach.) Nyl., 2 species (new); **Cyclographa** Wainio, new genus with 1 species (new); *Dendriscocaulon* Nyl., 1 species; *Diploschistes* Norman, 1 species; *Ectolechia* Trevis., 1 species; *Erioderma* Fée, 2 species; *Graphis* (Adans.) Nyl., 107 species (79 new); *Gyalecta* (Ach.) Wainio, 8 species (5 new); *Gyrostomum* Fries., 1 species; *Haplopyrenula* Müll.-Arg., 4 species (3 new); *Heppia* Naegeli, 1 species; *Lecaniella* Wainio, 1 species (new); *Lecidea* (Ach.) Th. Fr., 33 species (30 new); *Leptodendriscum* Wainio, 1 species; *Leptogium* (Ach.) Gray, 15 species (6 new); **Megalopsora** Wainio, new genus with 1 species (new); *Melaspilea* Nyl., 2 species (new); **Micropyrenula** Wainio, new genus with 1 species (new); *Microthelia* (Koerb.) Müll.-Arg. 1 species; **Mycopegrapha** Wainio, new genus with 1 species (new); *Opegrapha* (Humb.) Wainio, 17 species (10 new); *Pannaria* Delise, 13 species (7 new); *Parmeliella* (Müll.-Arg.) Wainio, 3 species; **Phylloblastia** Wainio, new genus with 1 species (new); **Phyllobrassia** Wainio, new genus with 1 species; *Physcidia* Tuck., 1 species; *Physma* Mass., 4 species (2 new); *Pilocarpon* Wainio, 5 species (4 new); *Polyblastia* (Mass.) Lonnr., 1 species (new); *Porina* (Ach.) Wainio, 20 species (17 new); *Psoroma* (Fr.) Nyl., 1 species; *Pseudopyrenula* (Müll-Arg.) Wainio, 4 species (new); *Pyrenula* (Fée) Wainio, 33 species (29 new); **Rhodothrix** Wainio, new genus with 1 species (new); **Semigyalecta** Wainio, new genus with 1 species (new); *Sphaerophorus* Persoon, 2 species; *Sporopodium* Montagne, 18 species (15 new); *Thalloedaema* (Mass.) Wainio, 1 species; *Thelenella* (Nyl.) Wainio, 3 species (new); **Thelidiopsis** Wainio, new genus with 1 species (new); *Thelotrema* (Ach.) Eschw., 30 species (24 new); *Toninia* Mass., 2 species (new); *Tricharia* (Fée) Wainio, 1 species; *Trichobacidia* Wainio, 1 species (new); *Trichothelium* Müll.-Arg., 3 species (new). In addition to the above, 2 genera of fungi are described: **Melaspileela** (Karst.) Wainio, with 2 species (1 new), and Didymosphaeria Sacc., with 3 new species.—An analysis of the Philippine lichen flora studied by Wainio shows that the tribe Graphideae, which reaches its maximum development in the tropics, furnishes 178 species, or over 28 per cent of the total number. The genus *Graphis*, with 107 species, is by far the most characteristic group, and this would still be true if the subgenera were to be elevated to generic rank. It is not likely that *Graphis* will be displaced from its dominant position by further discoveries though great alterations may be expected in the relative positions of some of the genera when the rock-dwelling lichens are collected and studied.—*Albert W. C. T. Herre.*

BACTERIA

1250. AYERS, S. H., P. RUPP, AND C. S. MUDGE. **The production of ammonia and carbon dioxide by streptococci.** Jour. Infect. Diseases 29: 235–260. 1921.—By the use of ammonia and carbon dioxide tests, the streptococci are divided into 4 groups: (1) Those producing no ammonia and no carbon dioxide from peptone; (2) those producing both ammonia and carbon dioxide from peptone; (3) those producing no ammonia, but forming carbon dioxide from dextrose; (4) those producing no ammonia but forming carbon dioxide, which does not come from peptone or dextrose. Ammonia can be readily determined colorimetrically. For testing carbon dioxide production the Eldredge fermentation tube is recommended.—*Selman A. Waksman.*

1251. BEWLEY, W. F., AND H. B. HUTCHINSON. **On the changes through which the nodule organism (Ps. radicicola) passes under cultural conditions.** Jour. Agric. Sci. 10: 144-162. *Pl. 1–2, fig. 1.* 1920.—While the portion of the life cycle of *Pseudomonas radicicola* confined to the nodules is fairly well known, little is known of it in the soil. The morphological changes occurring in nodules have not been reproduced in vitro and little is known concerning the chemical processes in the nodule. The authors employ various media containing soil extract, various salts, and carbohydrates. Nodule organisms from roots of red clover, broad bean, lucerne, and lupine were used and a definite life cycle was obtained. In neutral soil solution or

when the carbohydrate supply is exhausted, a small, non-motile, coccus form appears which is designated as the "non-motile, pre-swarmer stage." In the presence of saccarose, certain other carbohydrates, and phosphates the coccoid form increases in size to double its former diameter, but still remains non-motile. This is the "second pre-swarmer" stage. The "second pre-swarmer" now becomes ellipsoidal and develops high motility. This is the well known "swarmer" of Beijerinck. The organism in the "swarmer" stage now becomes more elongated, assuming a definite rod form and still remaining motile, though less so. The organism remains in this form as long as the medium contains sufficient available carbohydrate. When the organism is placed in neutral soil extract or when the available carbohydrate supply becomes exhausted it becomes highly vacuolated and the chromatin divides into a number of bands. These bands finally become rounded off and escape from the rod as the coccoid "pre-swarmers." The addition of calcium or magnesium to the medium or anaerobic conditions induce the "pre-swarmer" stage. The reaction of the soil has an important effect on the organism. The "pre-swarmer" stage is rapidly produced in calcareous soils, while in acid soils the cells become highly vacuolated and ultimately die. Slightly alkaline soils are capable of supporting vigorous growth without altering the form of the cells. High temperatures (30–37°C.) either prevent or postpone the breaking up of the rod forms.—*V. H. Young.*

1252. Donk, P. J. **A highly resistant thermophilic organism.** Jour. Bact. 5: 373–374. 1920.—A description is given of a bacterium isolated from canned corn which is very resistant to high temperatures; the author proposes the name *Bacillus stearothermophilus*.—*Chester A. Darling.*

1253. Esty, J. Russell. **The biology of Clostridium Welchii.** Jour. Bact. 5: 375–429. 1920.—Over 100 strains of *Clostridium Welchii* (*Bacillus aerogenes capsulatus*) were isolated from various sources and subjected to a rather complete series of tests; the study is arranged under the following headings: Isolation, distribution, morphology, spore formation, cultural characters, chemical characters, classification, thermal death point, pathogenicity, immunity, effects of feeding *Clostridium Welchii*, and conclusions.—*Chester A. Darling.*

1254. Hall, Ivan C. **Impure and misnamed stock cultures of obligate anaerobes.** Proc. Soc. Exp. Biol. and Med. 18: 314–316. 1921.—Sources of contamination of stock cultures are discussed.—*M. M. Brooks.*

1255. Hall, Ivan C. **The early history of litmus in bacteriology.** Science 53: 388–389. 1921.—The article deals mainly with the correction of certain errors but contains a list of 9 references.—*C. J. Lyon.*

1256. Jones, Dan H. **Further studies on the growth cycle of Azotobacter.** Jour. Bact. 5: 325–342. *Pl. 1–4.* 1920.—A review is given of some previous work done by the author on *Azotobacter*, followed by a consideration of the work and conclusions of Löhnis and Smith on "Life Cycles of the Bacteria" (Jour. Agric. Res. 6: 675–702. 1916.) The writer concludes from his observations that no endospores are formed in the 4 species which he studied; a symplastic stage occurs in which the individual cells are indistinguishable but numerous gonidia-like granules are present, being liberated when the cells disintegrate; these granules are reproductive bodies. The writer does not accept the conclusions of Löhnis and Smith that 2 or more cells unite; he interprets these stages as stages in fission.—*Chester A. Darling.*

1257. Kendall, A. I., M. Cook, and M. Ryan. **Methods of isolation and cultivation of anaerobic bacteria.** Jour. Infect. Diseases 29: 227–234. 1921.—The present information concerning the group of anaerobic bacteria is regarded as untrustworthy because no precautions have been taken to obtain the organisms free from aerobic and particularly anaerobic contaminations. The Barber method for the isolation of single cell cultures is modified for the isolation of single spores of anaerobic bacteria. Brain and meat media are used for the cultivation of the organisms; for peptone medium, a modification of the Hall tube is used.—*Selman A. Waksman.*

1258. PIROTTA, R. **Ulteriora ricerche sui bacilli radicali della Diplotaxis erucoides DC. [Further investigations on the bacilli on the roots of Diplotaxis erucoides DC.]** Atti R. Accad. Lincei Roma Rendiconti (Cl. Sci. Fis. Mat. e Nat.) 29[2]: 361–364. 1920.—Details of comparative cultural studies are given of 3 bacilli previously reported on *Diplotaxis erucoides*, showing that they act similarly on proteins and carbohydrates but with varying intensity.—*F. M. Blodgett.*

1259. RAMSBOTTOM, J. **Californian bees.** Trans. British Mycol. Soc. 7: 86–88. 1921. —See Bot. Absts. 10, Entry 1235.

1260. VIERLING, KARL. **Morphologische und physiologische Untersuchung über bodenbewohnende Mykobakterien. [Morphological and physiological investigation of soil-inhabiting mycobacteria.]** Centralbl. Bakt. II Abt. 52: 193–214. *Pl. 1.* 1920.—A detailed study is presented of a large number of soil-inhabiting mycobacteria. The growth and pigment production on potato was not found to be as luxuriant as is generally stated in the literature. The different color forms distinguished were red, white, yellow, and dirty yellow. Classification of these organisms is complicated by the existence of transition forms. The most variable character is color. Different strata of the same colony sometimes assume different colors, especially in old colonies. The author agrees with Lehmann and Neumann in separating the mycobacteria from the true bacteria and in placing them with the actinomyces. Multiplication by fission was not observed. Growth on solid and in liquid media is in the form of threads with monopodial branching. These threads break up readily, especially when allowed to dry on the cover glass, giving the appearance of bacillus and coccus forms. An important distinction between mycobacteria and ray fungi is the absence of aerial spores. The principal activity of these organisms in the soil seems to be in breaking down organized substances. The limited amount of quinones produced by certain strains may be of importance in this connection. The fact that the mycobacteria can utilize calcium nitrate makes it not unlikely that they take part in the dissociation of this artificial fertilizer. It is a significant fact that these organisms multiply rapidly in soils rich in humus.—*Anthony Berg.*

MYXOMYCETES

1261. BUCHET, S., H. CHERMEZON, ET F. EVRARD. **Matériaux pour la flore française des Myxomycètes. [French Myxomycetes.]** Bull. Trimest. Soc. Mycol. France 36: 106–121. 1920.—This article constitutes the 2nd work published by these authors on the subject, the 1st having appeared in 1912. Lists from herbaria and exsiccati are given, including mostly forms not already listed in previous publication. Extensive collections of new specimens from all parts of France are listed. A total of 132 species is reported from France. A short bibliography is given.—*D. S. Welch.*

1262. HADDEN, NORMAN G. **Mycetozoa at Porlock in October, 1920.** Trans. British Mycol. Soc. 7: 13–16. 1920.—During the first half of October the weather conditions were favorable for the fruiting of Myxomycetes on sawdust heaps while later in the month many interesting and some rare species were found on decaying logs, twigs, hedge clippings, and mosses. A number of species are discussed with reference to habitat and weather conditions.—*W. B. McDougall.*

PALEOBOTANY AND EVOLUTIONARY HISTORY

E. W. BERRY, *Editor*

(See also in this issue Entries 1089, 1094, 1188, 1392)

1263. BERRY, EDWARD W. **Tertiary fossil plants from Venezuela.** Proc. U. S. Nation. Mus. 59: 553–579. *Pl. 107–109.* 1921.—Plants are described from beds in the foothills of the Sierra de Merida in Venezuela which are considered to be of Miocene age. New species are described in the genera *Blechnum, Sabalites, Coussapoa, Ficus, Anona, Simaruba, Rhizo-*

phora, *Leguminosites*, *Sophora*, *Antholithus*, *Apocynophyllum*, and *Burserites*. Species of *Heliconia* and *Trigonia*, previously known from the Miocene of Colombia, are recorded, and the seed of a fossil species of *Entada* is described.—*E. W. Berry.*

1264. Chaney, R. W. **A fossil flora of the Puente formation of the Monterey group.** Amer. Jour. Sci. 2: 90–92. 1921.—About 18 species, 2 of which are marine algae and the remainder terrestrial plants, are recorded from the Miocene diatomaceous shales of southern California. They are said to indicate a climate much like that of the present in the same region, and consist largely of moist woodland and stream border plants, probably transported by streams to their resting place in the marine sediments of shallow coastal waters.—*E. W. Berry.*

1265. Gothan, W., und K. Nagel. **Über einen cedroiden Coniferenzapfen aus dem Unter-Eocän der Greifswalder Oie.** [On a cedar cone from the lower Eocene of Greifswalder Oie.] Jahrb. Preuss. Geol. Landesanstalt 41: 121–131. *Pl. 8.* 1920.—A well preserved phosphatized cone from the lower Eocene (Ypresian stage) of north Germany is described under the name of Apterostrobus *cedroides*. Minor differences are pointed out which distinguish it from the modern *Cedrus*.—*E. W. Berry.*

1266. Jessen, Knud. **Moseundersøgelser i det nordøstlige Sjaelland. Med Bemaerkninger om Træers og Buskes Indvandring og Vegetationes Historie.** [Bog investigations in northeast Sjaelland, with remarks on the immigration of trees and shrubs and the history of the vegetation.] Danmarks Geol. Undersøgelse 2[34]: 1–269. 1920.—This work contains a summary of previous results in the study and interpretation of the late Glacial and post Glacial bogs; detailed accounts, both geologic and ecologic, of the Danish bogs; lists of animals and plants found; and an account of the time of immigration and the subsequent history in Denmark of a large number of trees and shrubs. The pollen-statistical method is largely used and frequency curves are constructed for the different species. The results appear to point to the validity of the so-called Blytt-Sernander hypothesis of past alternations of climate. This study starts with late Glacial times, considered, on the basis of the geological work of DeGeer and Lidén, to have been about 11000 B. C. or slightly earlier. This was the time of the Older Dryas flora of *Dryas octopetala*, *Salix polaris*, *Salix reticulata*, *Betula nana*, etc., indicating a subarctic climate in Denmark with July temperatures of 8–12°C. This was followed by the Allerod period, marked by the introduction of *Betula intermedia*, *B. pubescens*, *Juniperus communis*, *Pinus silvestris*, *Populus tremula*, etc., indicating a temperate continental climate with July temperatures of 12–15°C. The Allerod period was followed by the Younger Dryas Period, with a recurrence of the climate and flora of the Older Dryas Period. Following this was a long warm period estimated as having lasted for about 7000 years, commencing about 7500 B. C., during which the climate in that region was warmer than at present. This warm period, which corresponds to the Ancylus Lake and the Litorina sea in the history of the Baltic, is divided into (1) an older Mullerup, Pine, or Boreal Period, during which the climate was dry and rather warm, with such plants as *Alnus glutinosa*, *Tilia cordata*, *Ulmus glabra*, *Cornus sanguinea*, *Corylus avellana*, *Prunus padus*, *Pinus silvestris*, etc., and (2) a mixed oak forest or Atlantic Period during which the climate was warm and humid, with July temperatures of about 17°C. The plants included *Acer platanoides*, *Fraxinus excelsior*, *Humulus lupulus*, *Trapa natans*, and, toward the close of the period, *Fagus silvatica*. Then followed (3) the beginning of the Beech Period, about contemporaneous with the Bronze Age, at which time July temperatures reached 18°C. and the climate was again dry and warm. At about 400 B. C. the temperature lessened and the climate became more humid. This corresponds to the Limnaea Sea stage of the Baltic, or to the Iron Age in Denmark, and is known as the Sub-Atlantic Period. The latter continued to the beginning of the Historic Period, which, in Denmark, was about 800 A. D.—*E. W. Berry.*

1267. Johnson, T., and J. G. Gilmore. **The occurrence of a Sequoia at Washing Bay.** Proc. Roy. Dublin Soc. 16: 345–352. *Pl. 13–14.* 1921.—The presence of *Sequoia Couttsiae* Heer in the upper Oligocene of Washing Bay, Ireland, is described, and from a microscopic study of the foliage its reference to the genus *Sequoia* is confirmed.—*E. W. Berry.*

1268. Johnson, T., and J. G. Gilmore. **The occurrence of Dewalquea in the coal bore at Washing Bay.** Proc. Roy. Dublin Soc. 16: 323–333. *Pl. 11–12.* 1921.—*Dewalquea hibernica* from the upper Oligocene of Washing Bay, Ireland, is described, together with the microscopic characters of the foliage. The author discusses the affinity of the genus and inclines to regard it a primitive member of the Juglandaceae.—*E. W. Berry.*

1269. Knowlton, F. H. **Criteria for determination of climate by means of fossil plants.** Bull. Geol. Soc. Amer. 32: 353–358. 1921.

1270. Knowlton, F. H. **Further remarks on the evolution of geologic climates.** Amer. Jour. Sci. 2: 187–196. 1921.—The author replies to criticisms and restates his conviction that throughout most of geologic time earth and not solar control was a dominant factor in terrestrial climates.—*E. W. Berry.*

1271. Moodie, Roy L. **Osteomyelitis in the Permian.** Science 53: 333. 1921.—The writer records infection by bacteria located in the spine of a reptile of the *Dimetrodon* type. —*C. J. Lyon.*

1272. Steinmann, G. **Rhatische Floren und Landverbindungen auf der Südhalbkugel. [Rhaetic floras and geography in the southern hemisphere.]** Geol. Rundschau 11: 350–354. *Fig. 1.* 1921.—The following fossil plants are recorded from the dark shales of Biobio in southern Chile: *Pecopteris* (*Asterotheca*) *Cottoni* Zeiller, *Cladophlebis Roesserti* Presl, *Cladophlebis australis* Morris, *Thinnfeldia* c.f. *rhomboidalis* Ett., c.f. *T. odontopteroides* Morris, *Clathropteris platyphylla* Goepp., c.f. *Podozamites distans* Presl. These are considered as indicating a Rhaetic age and denoting some land connection at that time with Australia and New Zealand.—*E. W. Berry.*

PATHOLOGY

G. H. Coons, *Editor*

C. W. Bennett, *Assistant Editor*

(See also in this issue Entries 911, 917, 922, 930, 1019, 1020, 1099, 1117, 1143, 1167, 1201, 1203, 1212, 1217, 1218, 1228, 1232, 1243, 1245, 1253)

PLANT DISEASE SURVEY; REPORTS OF DISEASE OCCURRENCE AND SEVERITY

1273. Arthur, J. C. **Origin of potato rust.** Science 53: 228–229. 1921.—The potato rust (*Puccinia pitteriana*, also found on tomatoes), mentioned by the writer in a short paper in Science (see Bot. Absts. 7, Entry 1127) was still occurring in Ecuador in 1919. It has not yet entered the U. S. A. Evidence is given in support of the theory that this rust has originated "somewhere between Ecuador and Costa Rica on hosts native to the locality."—*C. J. Lyon.*

1274. Chipp, T. F. **Another wet-rot and Poria hypobrunnea.** Gardens' Bull. Straits Settlements 2: 429–432. 1921.—This is an account of *Poria hypobrunnea* on *Hevea brasiliensis* in the Malay Peninsula, and a record of the occurrence of a similar fungus in Singapore upon *Spathodea companulata.*—*I. H. Burkill.*

1275. Cockayne, A. H. **Powdery scab in potatoes.** New Zealand Jour. Agric. 21: 169–174. *Pl. 1.* 1921.—Australia has declared a quarantine against potatoes from New Zealand on account of powdery scab (*Spongospora subterranea*). This disease is very common in some sections of New Zealand, but it does not appear to be destructive to the crop. Powdery scab is not known to occur in Australia. The distribution and characteristic appearance of the disease are given.—*N. J. Giddings.*

1276. Lee, H. Atherton, and Mariano G. Medalla. **Leaf stripe disease of sugar cane in the Philippines.** Science 54: 274–275. 1921.—It is thought that the sugar cane downy

mildew, *Sclerospora sacchari*, has been imported into the Philippines from Formosa. All possible measures have been taken to eradicate the disease.—*C. J. Lyon.*

1277. MOIR, W. STUART. **Recent observations on American white pines in Europe.** Amer. Plant Pest Committee Bull. 6: 7. [1921?]—In Norway, Sweden, and Denmark white pine (*Pinus strobus*) is no longer considered a profitable tree because of the ravages of blister rust. Gooseberries and currants, especially black currants, are very plentiful, and no attempts are made to control the rust by eradicating these alternate hosts. White pine is being replaced by Douglas fir and Sitka spruce. In Belgium cultivation of white pine has been abandoned because of the destructiveness of the rust. In France the disease is not considered particularly destructive. However, the author found a large percentage of the regeneration attacked and mature trees killed. Observations made in Europe on the susceptibility of sugar pine, western white pine, and limber pine show that these species are as readily attacked and as severely damaged as the eastern American white pine.—*W. H. Rankin.*

1278. REINKING, OTTO A. **Fiji disease of cane.** Facts about Sugar 12: 272–273. 1921. [Reprinted from Sugar Central and Planters News (Manila) 1: 16–20. 1920.]—This article includes a description of the Fiji disease of sugar cane and a warning as to the danger involved in shipping cane from the Fiji Islands.—*C. W. Edgerton.*

1279. SOUTH, F. W. **Certain host plants of Fomes lignosus and Ustulina zonata.** Agric. Bull. Federated Malay States 8: 242–243. 1920 [1921].—Bamboos in a plantation of *Hevea brasiliensis* showed infection with *Fomes lignosus*, and it appeared possible that the fungus exists also upon tubers of sweet potato, *Ipomoea Batatas*. *Ustulina zonata* was found on *Areca catechu*.—*I. H. Burkill.*

1280. STONE, R. E. **The strawberry troubles of 1921.** Canadian Hort. 44: 110–124. 1921.—Winter injury was very prevalent in the Niagara Peninsula, Ontario, due mainly to late, hard frosts after growth had well started. Leaf spot (*Mycosphaerella fragariae*) and leaf scorch (*Mollisia earliana*) were also destructive, due to weather favorable for the spread of these diseases during April and May. Prevention and remedies include planting only strong, vigorous sets on well drained soil, winter mulching, and spraying with Bordeaux mixture.—*E. F. Palmer.*

THE PATHOGENE (BIOLOGY; INFECTION PHENOMENA; DISPERSAL)

1281. BUGNON, P. **Sur un mode d'attaque et de contamination parasitaires des feuilles de lierre (Hedera Helix L.) déterminé par la pluie. [On infection of leaves of the ivy determined by rain.]** Bull. Trimest. Soc. Mycol. France 36: 172–174. *1 fig.* 1920.—Ivy leaves were observed bearing diseased areas on the lower edges. The parasite appears to be *Phyllosticta hedericola*. It is concluded that infection is brought about by rain water remaining on the lower edges of the leaves and producing conditions favorable for germination of the spores and infection of the host. It is suggested that if such is the case the configuration of the spots, although mentioned in classical diagnoses, is of little value as a specific character.—*D. S. Welch.*

1282. FRASER, W. P., AND D. L. BAILEY. **Biologic forms of wheat stem rust in western Canada.** Phytopathology 11: 202. 1921.—Four distinct biologic forms of stem rust (*Puccinia graminis*), identical with forms isolated by Stakman, have been found in western Canada.—*B. B. Higgins.*

1283. NEWTON, MARGARET. **Biologic forms of wheat stem rust in western Canada.** [Abstract.] Phytopathology 11: 202. 1921.—Five biologic forms of stem rust (*Puccinia graminis*), identical with forms isolated by Stakman, have been found in western Canada.—*B. B. Higgins.*

1284. ROBERTS, JOHN W. **The age of brown-rot mummies and the production of apothecia.** Phytopathology 11: 176–177. 1921.—Mummies of both peaches and plums decayed during the summer by *Sclerotinia cinerea* produced apothecia the following spring.—*B. B. Higgins.*

THE HOST (RESISTANCE; SUSCEPTIBILITY; MORBID ANATOMY AND PHYSIOLOGY)

1285. ALLEN, RUTH F. **Resistance to stem rust in Kanred wheat.** Science 53: 575–576. 1921.—A cytological study of *Puccinia graminis tritici* showed that when the urediniospores germinate, the germ tubes form appressoria at the opening of the leaf stomata. With Kanred wheat, only 10 per cent of rust inoculations were effective, though the appressoria were numerous. Measurement of stomatal slits in Kanred and Mindum wheats (the latter a less resistant type) showed that the openings in the Kanred variety are extremely long and narrow and those of the less resistant type are short and twice as wide.—*C. J. Lyon.*

1286. FORTÚN, G. M., Y S. C. BRUNER. **Investigaciones sobre la enfermedad del "mosaico" o "rayas amarillas" de la caña de azúcar. [Investigations on the mosaic of sugar cane.]** Rev. Agric. Com. y Trab. [Cuba] 3: 441–445. *1 fig.* 1921.—Fifty-two varieties of healthy sugar cane were planted in rows adjacent to mosaic sugar cane. At the end of 5 months all the varieties except the Uba, Japonesa, and Cayana, were more or less diseased. Tables are given showing the rate of infection and the total number of healthy and diseased stocks in each variety at the end of the experiment.—*F. M. Blodgett.*

1287. LEE, H. ATHERTON. **The relation of stocks to mottled leaf of citrus trees.** Philippine Jour. Sci. 18: 85–93. *Pl. 1–3.* 1921.—Experiments in the Philippines demonstrated that trees upon pumelo stock were badly affected with mottled leaf, while those on mandarin orange and calamondin stock were unaffected under the same conditions. The relationship of stock is not advanced as a cause of the disease, but the use of certain stocks is believed to predispose to the disease when the causal factors are present.—*Albert R. Sweetser.*

1288. PANTANELLI, E. **Sui rapporti fra nutrizione e recettività per la ruggine. [On the relation between nutrition and receptivity to rusts.]** Riv. Patol. Veg. 11: 36–54. 1921.—Pot and water cultures of wheat, oats, corn, and beans were grown with different nutrients to determine their respective receptivity to *Puccinia glumarum tritici*, *P. coronata*, *P. sorghi*, and *Uromyces fabea.* Special attention was paid to nutrition, activity of the roots, and composition of foliage at the time of attack. In general the better growing and better nourished plants were more receptive. An excess of phosphate in relation to nitrogen increases resistance only when it checks growth, whereas a phosphate nutrition proportional to the nitrogen nutrition and resulting in a regular growth has no influence on receptivity. Increased concentration of the liquid around the roots diminishes receptivity because it depresses the absorbent activity of the roots, not because it increases the osmotic pressure of the celi sap in the foliage; the latter does not appear to have a relation to receptivity. Probably the concentration of the organic substances of the sap is of importance, and it appears that the more the free acids increase in relation to the basic molecules, the greater the resistance. The most receptive organs are richest in sugars, in acids with large molecules, and in soluble compounds of phosphorus and nitrogen.—*F. M. Blodgett.*

1289. PINELLE, J. **Dégats causés à la végétation par les usines. [Damage to vegetation caused by factories.]** Jour. Soc. Nation. Hort. France 22: 50–51. 1921.—This is an account of injury to vegetation by cement dust. The scientific committee of the National Society of Horticulture of France advised that dust from the cement plant killed the plants by covering the leaves and checking respiration and transpiration. Legal action resulted in judgment against the factory.—*H. C. Thompson.*

DESCRIPTIVE PLANT PATHOLOGY

1290. BROCK, J. A. **Diseases of sugar beets.** Facts about Sugar 12: 470–471. 1921.—This is a short description of the different diseases of sugar beets.—*C. W. Edgerton.*

1291. COOK, MEL. T. [Rev. of: STEVENS, F. L. **Diseases of economic plants.** Macmillan and Company: New York, 1921.] Science 53: 502–503. 1921.

1292. DICKSON, B. T. **Studies on mosaic.** [Abstract.] Phytopathology 11: 202. 1921. —This includes a general discussion of mosaic diseases and notes on certain ones found in Quebec.—*B. B. Higgins.*

1293. EDGERTON, C. W., AND C. C. MORELAND. **Eggplant blight.** Louisiana Agric. Exp. Sta. Bull. 178. *44 p., 18 fig.* 1921.—The eggplant blight (*Phomopsis vexans*) reduces the yield in Louisiana 50–75 per cent. All parts of the host plant above ground during all stages of growth are affected. Leaf spot and fruit rot are the forms most commonly seen, but the disease also manifests itself as cankers on the stems, leaf fall, and damping off in the seed bed. The fungus lives from season to season on and in the seed and also upon old decaying parts of the host plant. There are 2 kinds of spores, both borne in somewhat variable pycnidia. Normal period of incubation is 7–9 days. Injury to the epidermis is not necessary for infection. Different eggplant varieties do not show equal susceptibility. Spraying is successful only when the plants are kept covered with the fungicide, which requires 10–12 sprayings in Louisiana. Control measures advocated include clean seed, rotation, strong plants for transplanting to the field, and the use of the most resistant varieties.—*C. W. Edgerton.*

1294. MCCULLOCK, LUCIA. **A bacterial disease of gladiolus.** Science 54: 115–116. 1921. —The disease affects the leaves, often only the lower ones, forming circular to elliptical lesions which are rusty red in color, becoming dull brown to purplish; in time the leaves collapse. The disease, which spreads rapidly only in warm and moist weather, has been found in the District of Columbia, Illinois, and possibly in California. The causal organism, *Bacterium marginatum* n. sp., is described, cultural characteristics being given; its group number is 211.2222022. The organism is resistant to cold but is killed at 52°C.—*C. J. Lyon.*

1295. MONTEMARTINI, L. **Un brusone dell'Aucuba japonica dovuto alla Pleospora infectoria Fuck. [A blight of the leaves of Aucuba japonica due to P. infectoria.]** Riv. Patol. Veg. 11: 33–35. 1921.—A fungus, causing a browning of the leaves of *Aucuba japonica* beginning at the tips and margins of the leaves, was found to correspond closely to *Pleospora infectoria;* but, because of the greater frequency of distichous asci, the smaller dimensions of the perithecia, and the new host, the variety name *aucubicola* is added. The imperfect stage corresponds to *Alternaria tenuis.*—*F. M. Blodgett.*

1296. POVAH, ALFRED H. W. **An attack of poplar canker following fire injury.** Phytopathology 11: 157–165. *Fig. 1–3.* 1921.—In a group of 70 poplar (*Populus grandidentata* and *P. tremuloides*) trees in a burned-over area, 50 became infected with *Cytospora chrysosperma.* Large cankers 1–10 feet long were produced on the trunks and branches, and approximately 3 months after the fire 27 of the trees had been girdled and killed. Pycnidia and spores were produced in great abundance on the cankers. Perithecia of *Valsa sordida* were also found on several cankers, but the relation of this ascigerous form to *Cytospora chrysosperma* has not yet been determined. Cuttings of *Populus tremuloides* and of *P. grandidentata* inoculated with spores of *Cytospora chrysosperma* were infected and killed.—*B. B. Higgins.*

1297. SAKURAI, M. **Ine no Kinkakubyô ni tsukite. [On the sclerotium diseases of rice.]** Ehime Kenritsu Nôji Shikenjô Shuppan Daiichigô (Ehime Agric. Exp. Sta. Publ. 1.) *51 p., 6 pl.* 1917. [In Japanese.]—Four diseases of rice due to sclerotia-forming fungi are described. *Hypochnus sasakii* attacks the plants from June to October, producing irregular brown spots on the leaf-sheaths and more rarely on the blades. Brown sclerotia are formed on the spots or betweenthe leaf-sheaths and the stems. A fungus resembling *Hypochnus centrifugus* forms sclerotia in the tissues of the leaf-sheaths, but the damage is slight. The sclerotia are spherical, white at first, then brown. A third fungus, resembling *Sclerotium oryzae,* attacks the stems and leaf-sheaths during August, causing lodging of plants and consequently heavy damage. The sclerotia are spherical to ovate, black on the surface and dark brown within.

Sclerotium oryzae attacks the leaf-sheaths and stems, causing considerable damage during the ripening season. The sclerotia are spherical to elliptical and more irregular than in the preceding species; the colors are similar.—Lime-Bordeaux mixture and kerosene were ineffective in checking any of these diseases. Lye from wood ashes checked the mycelial development of the first species only. Lime, unless used in large quantities and for long periods, was ineffective. The destruction of the sclerotia by piling the diseased straw with barnyard manure to permit fermentation is recommended as a preventive measure in all cases. Where a temperature of 40°C. is reached 4–7 days are necessary; at 50°C., 30–60 minutes are sufficient; at 60°C., 10 minutes suffice. In addition, application of wood ashes or of lime to fields containing diseased plants is desirable.—*Masao Yoshikawa.*

1298. Selby, A. D., and R. C. Thomas. **Impairment of clover seedings reported.** Monthly Bull. Ohio Agric. Exp. Sta. 6: 90–92. 1921.—This article comprises a preliminary report of a root-rot disease of red clover in Ohio. *Fusarium* sp. has consistently been associated with the disease.—*R. C. Thomas.*

1299. Thurston, H. W., Jr., and C. R. Orton. **A Phytophthora parasite on peony.** Science 54: 170–171. 1921.—Blighted peonies from Pennsylvania proved to be infected with a *Phytophthora* which has not yet been determined. The disease manifests itself as a necrotic condition of buds, surrounding leaves, and stem; infected areas are dark brown or black. Cultural characteristics are given. Zoosporangia are abundant and measure 16.7–22.3 × 20.4 –29.7 μ; oospores have not been observed.—*C. J. Lyon.*

1300. Wakefield, E. M. **Diseases of the oil palm in West Africa.** Agric. Bull. Federated Malay States 8: 244–246. 1920 [1921]. [Reprinted from Kew Bull. 1920: 306–308. 1920.] An account of the diseases of Elaeis guineensis.—*I. H. Burkill.*

1301. Weir, James R. **Notes on Cenangium abietis (Pers.) Rehm on Pinus ponderosa Laws.** Phytopathology 11: 166–170. *Fig. 1–2.* 1921.—*Cenangium abietis* has been found attacking young trees of *Pinus ponderosa* in the Bitterroot Valley, Montana. Apparently infection takes place in all cases through the terminal bud during late fall, and in most cases only the new growth is affected. The needles of infected twigs turn red during the winter, and drop during the following spring and summer, the twigs dying. In some cases where every terminal on a tree was thus killed the tree died before the end of summer.—Results from inoculations indicate that the fungus is parasitic, but is not very aggressive in spreading.—*B. B. Higgins.*

1302. Weir, James R. **Polyporus schweinitzii Fr. on Thuja plicata.** Phytopathology 11: 176. 1921.—A sporophore of *Polyporus schweinitzii* was found arising from the decayed heart wood of a living root of *Thuja plicata*. The rot extended up into the base of the tree and was uniform throughout the affected area, which indicates that this fungus is not the cause of the brown pocket rot often attributed to it.—*B. B. Higgins.*

ERADICATION AND CONTROL MEASURES

1303. Bisby, G. R. **The coöperative potato spraying projects: Progress report for 1918, 1919, and 1920.** Phytopathology 11: 178–193. 1921.—Following the suggestion of the War Emergency Board in 1918, a cooperative potato spraying experiment was undertaken. The author gives the plan of the proposed experiments to be carried out at various experiment stations throughout the U. S. A. and Canada, and also a summary of the work already completed and reported in publications or to him personally.—*B. B. Higgins.*

1304. Blair, R. J. **Decay in pulpwood-deterioration in pulp.** Paper Indust. 2: 95–98. *Fig. 1–3.* 1920.—The causes of decay in pulpwood and in pulp are discussed, and a detailed outline of an investigation of these causes is given.—*H. N. Lee.*

1305. Blair, R. J. **Prevention of decay in the timber of pulp and paper mill roofs.** Paper Indust. 1: 837–841, 854. *Fig. 1–6.* 1920.—The author gives a description of the types of roofs commonly used and the defects therein; also the causes of, and methods of preventing, decay.—*H. N. Lee.*

1306. Cross, Wm. E. **The Java-Argentina seedling sugar canes.** Louisiana Planter 66: 184. 1921.—Some of the Java sugar cane seedlings have largely replaced other varieties in Argentina as they are superior in many ways, notably in their greater resistance to mosaic and root rot.—*C. W. Edgerton.*

1307. Detwiler, Samuel B. **White pine blister rust control.** Amer. Plant Pest Committee Bull. 6: 1–6. [1921?].—This summarizes the relation of currants and gooseberries to the spread of the rust and the results obtained by eradicating these alternate hosts.—Methods of eradication are given and arguments advanced for the general use of these methods by all owners of white pine in the northeastern U. S. A.—Investigations underlying these control recommendations were more fully treated in Bulletins 2 and 4 (see Bot. Absts. 3, Entries 393, 396, 416, 417; and 7, Entries 1140, 1203, 1224, 1246).—*W. H. Rankin.*

1308. Edgerton, C. W., and G. L. Tiebout. **The mosaic disease of the Irish potato and the use of certified potato seed.** Louisiana Agric. Exp. Sta. Bull. 181. *15 p., fig. 1–3.* 1921.—In Louisiana the mosaic disease of potatoes considerably reduces the yield of the Bliss Triumph variety, a 50 per cent loss being not uncommon. The mottled appearance of the leaves is common early in the season, but with the approach of warm weather the leaves appear merely curly. The dwarf stage is very common. The Triumph is the only variety extensively grown in Louisiana which is seriously affected by the mosaic, which has occurred there since 1909. Fields from the ordinary commerical Triumph seed which is shipped into Louisiana from the northern U. S. A. generally show a percentage of mosaic plants as high as 50–95.—Certified seed has given variable results. The majority of the lots of certified seed tested have been superior to commercial seed, though some have been very poor, giving a very high percentage of mosaic. Growers, also, have had variable results with certified seed; in 1921 some growers did not recover their seed. It is recommended that growers pay more attention to the certificates of the seed producers, refusing to buy seed showing more than a minimum of mosaic.—*C. W. Edgerton.*

1309. Edwards, W. M. O. **Giving medicine to trees.** Florists' Exchange 50: 1078. 1920.—The writer, replying to previous notes on this subject (Florists' Exchange 50: 327) in which is pointed out the futility of injecting chemicals into trees to control diseases, claims that strong perfumes such as musk and apple oil soon check and destroy any blight. A soluble substance introduced into the sap penetrates to every part of the tree, although with diminishing strength. This is made use of in treating trees, enabling them to repel certain diseases for some time. Treatment has been successful in many kinds of trees, including chestnut (for blight —*Endothia parasitica*), apple, pear, peach, larch, hickory, and birch. At one time the writer had a number of young chestnut trees growing in tubs, all of which were more or less affected with blight, but when watered with various solutions (not named) 8 outgrew the disease.—*L. A. Minns.*

1310. Fisher, D. F. **Controlling brown rot of stone fruits.** Better Fruit 15: 3–4, 15. *Fig. 1–2.* 1921.—This disease, manifesting itself as twig and limb cankers and especially "blossom blight," which materially reduces the set of fruit, is a most serious menace to stone fruit crops in northwestern U. S. A. because of its attacks on ripening as well as immature fruits. The life history of the fungus is described, and preventive measures, such as destruction of mummies and open pruning, are suggested. Self-boiled lime-sulphur 8–8–50 is suggested as the safest and best fungicide for controlling this disease.—*S. M. Zeller.*

1311. Gouaux, C. B., and others. **Report of committee on agricultural progress of the Louisiana Sugar Planters' Association for the year 1920.** Louisiana Planter and Sugar Manufacturer 66: 185–189. 1921.—This includes a discussion of the sugar cane mosaic, its spread in

Louisiana, and experimental tests of rogueing as a control measure. Also experiments with fertilizers and tests with various seedling canes are described.—*C. W. Edgerton.*

1312. Guba, E. F. **Effect of dormant lime sulfur upon the control of apple blotch.** Science 53: 484–485. 1921.—The writer questions the reported controlling of apple blotch (*Phyllosticta solitaria*) by 1 spraying before the buds swell and attributes its failure to the fact that only the spores and sporidial layer within the pseudo-pycnidia are killed, the new infectious area that advances from the initial canker in the spring being unharmed.—*C. J. Lyon.*

1313. Howitt, J. E. **Experiments with Haskell's method or the so-called dry formaldehyde treatment for the prevention of oat smut.** [Abstract.] Phytopathology 11: 203. 1921.—This method of treating oats has proved very satisfactory. Its chief points of advantage over the older methods are simplicity, and rapidity and ease of application.—*B. B. Higgins.*

1314. Kress, Otto, and C. J. Humphrey. **Progress report on the study of wood and wood pulp infection and decay.** Paper Indust. 2: 691–694. 1920.—Specific directions are given for storing pulp wood and pulp so as to prevent decay. The results of paper-making tests on decayed pulps and of comparative pulping tests on infected and sound wood are included.—*H. N. Lee.*

1315. Kress, Otto, C. J. Humphrey, and C. Audrey Richards. **Some observations on the deterioration of wood and wood pulp.** Paper Indust. 1: 526–531. *11 fig.* 1919.—Physical, chemical, and paper-making characteristics of clean and of decayed pulps are described, causes of decay and remedial measures are discussed, and characters by which molds may be distinguished from wood-destroying fungi are given.—*H. N. Lee.*

1316. Lochhead, W. **A quarter century of lime-sulphur.** Canadian Hort. 44: 1–24. 1921.

1317. Manuel, H. L. **Black spot or anthracnose.** Agric. Gas. New South Wales 32: 581–582. 1921.—The writer describes anthracnose disease (*Gloeosporium ampelophagum*) of the vine (*Vitis* spp.), which has been severe in certain areas, and discusses methods of control. He recommends swabbing the vines with the following preparation: 50 pounds sulphate of iron dissolved in ½ gallon sulphuric acid in 10 gallons of water.—*L. R. Waldron.*

1318. Nishikado, Y., and C. Miyake. **Momitane no shôdoku narabini Ine Gomahagarebyô no Yobôhô.** [On seed treatment of rice against sesame-spot leaf blight.] **I. Momidane no Ontô Shinsekihô.** [Hot-water treatment of seed rice.] Byôchû-gai Zasshi (Jour. Plant Protection Japan) 5: 693–712 (1–20). 1918.—*Helminthosporium oryzae*, a serious disease of rice seedlings, is spread largely by means of conidia carried on the seed grain. Experiments have shown that the conidia can be destroyed by treatment with hot water at 48–50°C. for 10 minutes. A preliminary soaking in cold water reduces the resistance of the grain to heat, although long continued soaking in water at 15°C. followed by a 10 minute immersion in hot water at 50–52°C. did not result in lowered germination. To control the disease immersion of seed grain for 10 minutes in hot water at 52°C. or for 5 minutes at 54°C. after a preliminary soaking of 24 hours in cold water is recommended.—*Masao Yoshikawa.*

1319. Pennington, L. H., W. H. Snell, H. H. York, and Perley Spalding. **Investigations of Cronartium ribicola in 1920.** Phytopathology 11: 170–172. 1921.—A summary and a brief discussion are given of the results obtained during the year by various investigators. The results show that large areas of *Ribes* are sometimes killed by the fungus. Hence the absence of *Ribes* from an infected area may not mean that it has never been present. The writers confirm previous conclusions that aeciospores may be blown an indefinite number of miles and remain infectious.—*B. B. Higgins.*

1320. Pennington, S., and H. G. Robinson. **Spraying of potatoes for "blight" or "potato disease" (Phytophthora infestans).** Bull. Univ. Coll. Reading 30. *8 p.* 1921.—The experiments described by the authors represent a record of 9 years' systematic trial of ordinary field spray-

ers under field conditions. Bordeaux mixture was used throughout the period, the proportions used being 14 pounds copper sulphate and 9½ pounds lime in 100 gallons of water. The field sprayed was divided into 4 plots, one of which was not sprayed, the second sprayed early, the third late, and the fourth both early and late. The early spraying was made about a fortnight after the potatoes were earthed up, usually about the end of June or beginning of July, and the second or late spraying was made 2–3 weeks later. The authors conclude that for the 9-year period spraying increased the total yield of all the plots; that one late spraying is better than one early spraying, but that double spraying is superior to either alone.—In every case spraying increased the percentage of sound saleable potatoes. The unsprayed plot yielded 4½ tons saleable tubers, the once-sprayed plots over 5¼ tons, and the twice-sprayed plots 5¾ tons. The percentage by weight of seed stock in the plots showed a small reduction in the case of sprayed plots, but as the total crop was greater in these, the total amount of seed was slightly greater in the sprayed plots. Spraying reduced the number of small potatoes, which in turn reduced the total yield. The authors claim that their results establish the economy of spraying. Diagram 1 represents the effect of spraying on crop yield, and diagram 2 compares the percentage of diseased tubers (average of 4 plots) and the rainfall.—*W. Stuart.*

1321. SANDERS, GEORGE E. **Dusting to date in Nova Scotia.** Canadian Hort. 44: 1–24. 1921.

1322. SEVERIN, HENRY H. P. **Practical use of curly leaf symptoms.** Facts about Sugar 12: 170–173, 212–214. *Fig. 1–25.* 1921.—All of the different symptoms of the curly leaf disease of sugar beets are described, and each symptom is illustrated.—*C. W. Edgerton.*

1323. STEVENSON, JOHN A. **Control of sugar cane mottling disease.** Sugar 23: 92–95. *1 fig.* 1921.—Symptoms of the mosaic disease of sugar cane are described, and theories in regard to its cause discussed. The various organisms found on cane have no connection with the mosaic. The ultimate solution of the mosaic problem is stated to be the use of immune or resistant varieties.—*C. W. Edgerton.*

MISCELLANEOUS (COGNATE RESEARCHES, TECHNIQUE, ETC.)

1324. ANGELIS D'OSSAT, G. DE. **Calcare e viti americane.** [Lime and American grapes.] Atti R. Accad. Lincei Roma Rend. (Cl. Sci. Fis. Mat. e Nat.) 29^2: 58–62. *1 fig.* 1920.—This includes a discussion and review of some previously reported work on the relation between the lime present in the soil and the chlorosis of the grape vine. [See Bot. Absts. 7, Entry 2120.]—*F. M. Blodgett.*

1325. CAESAR, L. **Practical hints for the young plant pathologist.** [Abstract.] Phytopathology 11: 203–204. 1921.

1326. EDGERTON, C. W. **Plant disease investigations at the Agricultural Experiment Station.** Univ. Bull. Louisiana State Univ. 13^7: *18 p., fig. 1–7.* 1921.—Plant diseases and their importance in Louisiana are discussed, and an outline is given of the work that has been and is being done at the Louisiana Experiment Station.—*C. W. Edgerton.*

1327. HORN, DAVID WILBUR. **Fumigation with formaldehyde—a substitute for the permanganate-formalin method.** Jour. Indust. and Engineering Chem. 11: 126–129. 1919.—The use of bleaching powder and formalin in fumigating rooms is proposed, "using 620 g. bleaching powder and 800 cc. formalin for each 1000 cubic feet to be fumigated; as much formaldehyde gas will be thrown off into the room as by the use of 250 g. of permanganate and 500 cc. formalin, and at only ⅛ the cost."—*G. H. Coons.*

1328. HUMBERT, ERNST E. A chisel forceps. Phytopathology 11: 175. *Fig. 1* 1921.—It is claimed this instrument will be valuable in cutting and transferring to media bits of diseased wood.—*B. B. Higgins.*

PHARMACOGNOSY AND PHARMACEUTICAL BOTANY

H. W. Youngken, *Editor*
E. N. Gathercoal, *Assistant Editor*

(See also in this issue Entries 873, 895, 927, 929, 941, 1000, 1037, 1039, 1054, 1082, 1131, 1145, 1235, 1405)

1329. Anonymous. **Comité interministeriel des plantes médicinales et à essences. Les plantes médicinales dans le department du Gard. [Interministerial committee of medicinal plants and substances. The medicinal plants in the department of Gard.]** Nimes, 1920.

1330. Bevan, W. **Sage.** Cyprus Agric. Jour. 16: 34–36. 1921.—The present article (continued from Cyprus Jour. 15: 242. 1920) describes the method of cultivating sage applicable to Cyprus. The Cyprus varieties used for medicinal or culinary purposes are *Salvia officinalis, S. triloba*, and *S. Cypria* or *Willeana* (Holboe), the former being very common in the hills; both could be successfully cultivated. In Cyprus sage is almost a perennial but as a rule it degenerates after 3–4 years. Propagation by cuttings is claimed to be preferable to seed propagation. The largest demand for sage is for culinary purposes, what is known as the White variety being most suitable. For medicinal purposes Red Sage is mostly used. Instructions for drying sage are given and the period that the dried product can be successfully kept is given as 1 year. The sage oil of commerce is obtained from *Salvia officinalis*, which grows wild in Dalmatia.—*W. Stuart.*

1331. Puxeddu, E., e F. Vodret. **Sull' essenza estratta dalle bacche di Juniperus phoenicea L. di Sardegna. [The essential oils of Juniperus phoenicea from Sardinia.]** Gazz. Chim. Ital. 50^2: 245–257. 1920.—A brief review of the literature on the subject is followed by a description of the methods of extraction and a study of the properties of the oil. The density, rotatory power, viscosity, solubilities, index of refraction, saponification number, acidity, ether index, acetyl number, content of aldehydes and phenols, Maumené number, iodine and bromine numbers, as well as color reactions are studied.—*A. Bonazzi.*

PHYSIOLOGY

B. M. Duggar, *Editor*
C. W. Dodge, *Assistant Editor*

(See also in this issue Entries 871, 880, 916, 948, 962, 964, 967, 999, 1015, 1112, 1190, 1192, 1193, 1196, 1235, 1250, 1251, 1252, 1253, 1260, 1288, 1289, 1324, 1367, 1376, 1378, 1379, 1380, 1382, 1446)

GENERAL

1332. Morrow, C. A. [Rev. of: Onslow, M. W. **Practical plant biochemistry.** *viii + 178 p.* University Press: Cambridge, 1920 (see Bot. Absts. 8, Entry 602.)] Science 53: 416–417. 1921.

DIFFUSION, PHYSICO-CHEMICAL RELATIONS

1333. Brown, J. Howard. **H ions, titration and the buffer index of bacteriological media.** Proc. Soc. Exp. Biol. and Med. 18: 285–286. 1921.—This paper stresses the importance of determining the buffer effects of media by titration against acid and alkali.—*M. M. Brooks.*

1334. Karrer, Joanne L., and R. W. Webb. **Titration curves of certain liquid culture media.** Ann. Missouri Bot. Gard. 7: 299–305. 1920.—Titration curves are given for a beet decoction, peptone solution, and Czapek's, Pfeffer's, and Richard's solutions.—*S. M. Zeller.*

MINERAL NUTRIENTS

1335. Duggar, B. M. **The use of "insoluble" salts in balanced solutions for seed plants.** Ann. Missouri Bot. Gard. 7: 307–327. 1920.—Results of experiments prepared "to determine the possible value of certain relatively insoluble salts in furnishing the necessary ions for the growth of seed plants" are reported. If such salts should slowly become available in culture solutions "it would only be necessary to add to the culture vessel a surplus of the substances required" in order to imitate in some measure " the chemical relations in the soil." Thus as the plants absorb certain ions the equilibrium of these ions might be maintained by the further solution of the substances furnishing the ions. "As sources of Ca, Mg, Fe, PO_4, SO_4, many insoluble salts have been tested, but no salt of this type is procurable as a practical source of NO_3, so that in most experiments this ion is furnished by KNO_3. A relatively insoluble source of NH_4 ($Mg\,NH_4\,PO_4$) has been found unsatisfactory as a source of nitrogen with the test plants used. In each of three series of cultures in which wheat or wheat and corn were used, one or more of the combinations containing two or more insoluble salts exceeded the growth in the best control solution," which contained $CaSO_4$, $MgSO_4$, soluble ferric phospate, and KNO_3. "In all series, with the test plants mentioned, a group of cultures approached very closely the yields of the best combinations, and in all cases in such best combinations the calcium salt is relatively more soluble than the magnesium salt, except in certain combinations into which ferric citrate enters. Soluble ferric phosphate has proved a valuable constituent in the culture medium in a variety of combinations. In certain cases ferric citrate has proved equally valuable."—*S. M. Zeller.*

1336. Gile, P. L., and J. O. Carrero. **Assimilation of nitrogen, phosphorus and potassium by corn when nutrient salts are confined to different roots.** Jour. Agric. Res. 21: 545–573. 1921.—The paper reports the results of an investigation concerning the assimilation of nitrogen, potassium, and phosphorus when either all the roots were contained in 1 culture vessel with all nutrients, or when the roots were divided between 2 solutions each of which lacked 1 or 2 elements, or 1 solution was complete and the other lacked 1 or 2 elements, or when the roots were divided among 3 flasks each of which lacked 1 or 2 elements. Corn, *Zea Mays*, was used in all the experiments. In all nutrient solutions except those lacking potassium the ratios of bases were as follows: 1 Mg: 4 Ca : 5.3 Na : 14 K. In the solution lacking potassium the ratios were 1 Mg: 4 Ca: 6 Na. Calcium carbonate was used in all cultures. For each treatment 16 plants were used.—The paper contains many detailed figures with respect to root growth, growth of tops, percentage of total roots in the different culture vessels, analytical data on the percentage of nitrogen and K_2O in roots and N, K_2O, and P_2O_5 in tops, as well as figures on the mean assimilation of N, P_2O_5, and K_2O relative to that of the control plants, all roots of which were grown in flasks containing the complete solution.—Some of the general facts brought out are as follows: Depression of growth and assimilation of nutrients are related to the extent to which nutrients are restricted to separate root portions; ratio of root to top growth increases with depression of total growth and assimilation of nutrients; growth of roots in the complete nutrient solutions is "bushy" in habit and greater in extent; in solutions containing nitrogen root growth was greatest. Withholding nitrogen from a part of the root system does not manifest itself so strikingly in the nitrogen content of those roots as withholding either phosphorus or potassium affects the content of these elements.—It is suggested that the diminished assimilation of nutrients under the conditions outlined is not due to inability of roots to absorb the ions with sufficient rapidity, but is due rather to the slowness with which the ions are translocated to the cells where they are utilized. When, for example, the roots are divided into 3 portions, each portion supplied with only 1 of the 3 elements, then, according to the author, it is probable that each element is translocated in different bundles separated from each other. The tissue adjacent to any group of bundles may have a surplus of the 1 element, but the utilization of this 1 is dependent on the other 2, which reach this tissue only with difficulty.—The increased ratio of roots to tops with decreased assimilation may be due to the fact that the root growth is less influenced; or the greater relative root growth may be due to increased movement of organic compounds to the roots, due to a reduced supply of nutrients in the stalk and leaves.—*Lewis Knudson.*

1337. Trelease, Sam F. **The relation of salt proportions and concentrations to the growth of young wheat plants in nutrient solutions containing a chloride.** Philippine Jour. Sci. 17: 527–603. *Fig. 1–18.* 1920.—This study was undertaken to throw more light upon the influence of considerable amounts of potassium chloride in a nutrient solution that also contains other salts supplying all the essential elements. No injurious or retarding effect was observed that could be definitely ascribed to high partial concentrations of potassium chloride, and no characteristic injury was seen that could with certainty be related to the chloride.—*Albert R. Sweetser.*

PHOTOSYNTHESIS

1338. Anonymous. **Carbon-dioxide as a fertilizer.** Sci. Amer. Monthly 3: 141. 1921.

METABOLISM (GENERAL)

1339. Bertolo, P. **Azione dell' acido solforico sull' artemisina.[The action of sulphuric acid upon artemisin.]** Gazz. Chim. Ital. 50: 114–119. 1920.

1340. Bertolo, P. **Nuove ricerche sull' artemisina. [A new study of artemisin.]** Gazz. Chim. Ital. 50: 109–113. 1920.—In the previous communications the author established the identity of the compound, and in the present paper the action of sulphuric acid, hydriodic acid, sodium, chlorine, acetyl-chloride, barium hydrate, and of light are determined.—*A. Bonazzi.*

1341. Ciamician, G., e C. Ravenna. **Considerazioni intorno alla funzione degli alcaloidi nelle piante. [The functions of alkaloids in plants.]** Atti R. Accad. Lincei Roma Rend. (Cl. Sci. Fis. Mat. e Nat.) 29^1: 416–420. 1920.—Having found, as reported in a previous article (same publication 29^1: 10. 1920), that betaine —differing from the quaternary bases, such as the salts of tetramethyl ammonia—is only slightly toxic to the bean plant, the authors endeavored unsuccessfully to relate the lack of toxicity to the occurrence of this substance in the bean plant. They also tried to isolate from the extract of the bean plant the volatile bases described by Pictet, which should be of a pyrroline or pyrrolidine nature, the so-called protoalkaloids; but instead found trimethyl amine, which was in accord with their previous results with other plants. They review previous papers to show that the natural alkaloids have in general a markedly toxic action on plants, which indicates that they may have the function of vegetable hormones and prefer this explanation to that of Bernardini, that they are refuse products of catabolism transformed into alkaloids to protect the plants from external enemies. —*F. M. Blodgett.*

1342. Ciamician, G., e C. Ravenna. **Sul contegno di alcune sostanze organiche nei vegetali. XIII. [Upon the behavior of some organic substances in plants. 13th note.]** Gazz. Chim. Ital. 51^1: 200–222. *Fig. 1–3.* 1921.—This is one of a series of papers dealing with the behavior of living plants towards organic substances when such substances are absorbed by the roots or when they are directly inoculated into the tissues (see Bot. Absts. 5, Entry 2240; 6, Entry 1317; 7, Entries 2133, 2134; 10, Entries 1341, 1362). The present contribution is divided as follows: (1) Behavior of *Phaseolus* towards ethyl-, propl-, butyl-, and amylamine, glycocoll, alanine, leucine, and isoamylamine when neutralized by H_3PO_4. (2) Role of the degree of hydrogenation of the compounds studied. In this chapter are studied phthalic and tetrahydrophthalic acids, quinoline and tetrahydroquinoline, and cymene and limonene. (3) Behavior of condensed benzene nuclei, a comparison of aniline and naphthylamine. (4) Role of the length of the carbon chain, studied by a comparison of formic, acetic, propionic, butyric, and valeric acids as well as of isovaleric, caprylic, lauric, and palmitic acids. (5) Number of methyl radicles, a comparison of carbopyrrolic against dimethylpyrrolic-dicarbonic acids, and glucose against methylglucoside, K_2SO_4, and $K\text{-}CH_3\cdot SO_4$. The substances studied were applied to *Phaseolus* growing in a substrate of cotton. The type of development after treatment was taken as an index of the physiological value of the substance. (6 and 8) The fact

that betain is not toxic to *Phaseolus* may indicate that this compound is normally present in this plant, but tests made on large quantities of extracts of plants at the time of inception of flowering failed to demonstrate this substance. It was also shown that the tartaric acid extract of these plants did not contain the pyrrolic bases of Pictet. Esterin, which is normally present in *Phytostigma*, is extremely toxic to *Phaseolus* and *Lycopersicum*. (7) The capacity for oxidation of some compounds was studied by incubating them with the pulp of *Spinacia* in an atmosphere of oxygen. The following are the results: Pyrocatechin, morphine, theobromine, cocaine, atropine, butyric and isobutyric acids are oxidized, while guaiacol, codeine, caffeine, methyl-,ethyl-, and propylamines are not oxidized. When injected into growing *Zea* plants morphine, caffeine, theobromine, butyric and isobutyric acids are oxidized, whereas codeine is not. (9) Tannin is only slightly if at all absorbed by growing *Phaseolus*, *Solanum*, *Zea*, and *Nicotiana* but it appears to induce a general dwarfing, that is the production of a normal dwarf plant. Inoculations led to the same results. As a summary of the conclusions the following may be stated: The amines studied are distinctly toxic while the amino acids are not. Toxicity increases with the degree of hydrogenation. Compounds with condensed benzene nuclei are more toxic than those with single benzene rings. Toxicity is not connected with the length of the carbon chain in the acids. Organic bases are distinctly toxic. The methyl radicle in the compounds studied is not toxic. Plants appear to require the stimulation of alkaloids and so utilize the compounds of decomposition, such as xanthine, through the introduction into such molecules of alcohol or acid radicles. Only such plants as normally contain a given poison are immune to its effects.—*A. Bonazzi.*

1343. Duggar, B. M. **The nutritive value of the food reserve in cotyledons.** Ann. Missouri Bot. Gard. 7: 291–298. 1920.—Experiments with Canada field peas show "that for a growth interval of 24 days the removal of the cotyledons after the second day induces a marked depression in the growth rate and this depression is increasingly less, until, when the removal of the cotyledons occurs after 7 days, the amount of growth is very nearly the same as in the control, with cotyledons intact." The cotyledons are practically exhausted in somewhat less than 10 days. In the case of corn effects are neither so striking nor permanent as in peas. The substitution for cotyledons of peas of such organic nitrogenous nutrients as glycocoll, alanin, sodium asparaginate, and sodium nucleinate yielded no proper compensation for the loss of cotyledons, but it is hoped that further experiments along this line where plants are grown under sterile conditions may reveal the nature of the special growth-inducing agent furnished by cotyledons.—*S. M. Zeller.*

1344. Gerretsen, F. C. **Über die Ursache des Leuchtens der Leuchtbakterien. [The causes of the light in the luminous bacteria.]** Centralbl. Bakt. II Abt. 52: 353–373. *Pl. 2.* 1920.—This investigation was undertaken from the point of view that production of light in luminescent bacteria is due to an enzyme. The relation of the constituents of the culture media to the production of light was carefully studied. In view of the occurrence of so many luminescent organisms in the sea, the role of sodium chloride was carefully investigated. It was found that Cl could be replaced by other anions without materially influencing the light production. The cation, however, could be replaced only by Mg without greatly inhibiting light production. When both anion and cation are replaced the production of light is considerably less than it is in solutions containing sodium salts, or magnesium chloride. The peptones may serve both the nitrogen and carbon requirements of the bacteria, and for the production of light cannot be replaced by any other source of nitrogen. Sterile fish bouillon treated with warm lye and subsequently oxidized with bromine water produced a greenish light similar to that emitted by bacteria. The hexoses have a favorable influence on light production. This may be partly due to the formation of acids which neutralize the toxic alkaline cleavage products of the peptones. Ultraviolet light was found to be an excellent means for killing the organisms without destroying the light function. A light-producing substance, photogen, is produced intracellularly by the enzyme photogenase. The production of light is purely a chemical process and is brought about by the oxidation of the photogen by the oxidase luciferase.—*Anthony Berg.*

1345. VERKADE, P. E. **Über die Angreifbarkeit organischer Verbindungen durch Mikroorganismen. II. Mitteilung. [The susceptibility of organic compounds to the attack of microorganisms. II.]** Centralbl. Bakt. II Abt. 52: 273–280. 1920.—This is an attack upon Overton's theory of the permeability of the plasmamembrane; more particularly in reference to the following: That the behavior of the substances of the plasmamembrane as a solvent is parallel to that of olive oil; that the solubility of a substances in olive oil is an index of its ability to penetrate the plasmamembrane, and so of its narcotic effect on the cell. Verkade tested the solubility of benzoic, salicylic, and cinnamic acids at 25°C. in a number of carefully refined fatty oils, and he concludes that the solubility of any organic acid in an oil is not a fixed quantity, but varies with the composition of the oil. Even with oils of similar composition, such as olive, cotton seed, and cocoanut oils, the dissolving power for the acids was quite different. The solubility of a substance in olive oil is an isolated fact, and offers no indication of its solubility in any other fatty substance. This paper does not stress, though it does refer to, the described parallelism between the partition coefficients of different compounds and their relation to the assimilation of certain microorganisms. —*Anthony Berg.*

METABOLISM (ENZYMES, FERMENTATION)

1346. NORTHROP, JOHN H. **The mechanism of an enzyme reaction as exemplified by pepsin digestion.** Science 53: 391–393. 1921.—Experimental data for this paper are to be found in recent numbers of the Journal of General Physiology (see Bot. Absts. 8, Entries 648, 649; 9, Entry 1635; 10, Entry 282). The peculiarities of general enzyme reactions are listed. In the case of pepsin digestion it has been found that these peculiarities may be quantitatively accounted for on the basis of "a chemical reaction in which the pepsin as well as the protein takes part." This explanation also accounts for the specificity of the pepsin action.—*C. J. Lyon.*

ORGANISM AS A WHOLE

1347. KOPELOFF, NICHOLAS, AND STERNE MORSE. **Studies in atmospheric requirements of bacteria. I. Water vapor tension.** Proc. Soc. Exp. Biol. and Med. 18: 308–310. 1921.—It was found that inhibition of growth of surface colonies of *B. coli*, *B. subtilis*, *Staphylococcus aureus*, and *Streptococcus hemolyticus* occurred when the water vapor tension was lowered.—*M. M. Brooks.*

1348. KUFFERATH, H. **Recherches physiologiques sur les algues vertes cultivées en culture pure. I. [Physiological investigations on green algae grown in pure culture. I.]** Bull. Soc. Roy. Bot. Belgique 54: 49–77. 1921.—The author first refers to the work already done concerning the action of gelatin in high concentrations upon microorganisms, and then reports his own results on the action of concentrated gelatinous media upon pure cultures of algae. It is concluded that the species experimented upon react in a rather constant manner in respect to concentration. Certain algae grow at practically any concentration (*Chlorella luteo-viridis* Chodat var. *lutescens* Chodat, *C. vulgaris* Beyerinck, *Oocystis* sp., *O. Naegelii* A. Br., *Stichococcus membranaefaciens* Chodat, *S. bacillaris* Naegeli, and various others). The development is better and more abundant in the lower concentrations. At the higher concentrations, 25–30 per cent gelatin, the following species scarcely grow at all: *Hormidium flaccidum* (Kūtz.) Braun f. *nitens*, *H. dissectum* (Gay) Chodat, *H. lubricum* Chodat, *Stichococcus lacustris* Chodat, *Chlamydomonas intermedia* Chodat, *Chlorococcum viscosum* Chodat. Except for *Stichococcus*, there is within certain limits quite constantly an increase in cellular dimensions in proportion to the increase in concentrations. There is in general an advantage in using weak concentrations of gelatin for isolations and for the cultures.—*Henri Micheels.*

1349. LINDET, M. L. **De l'influence que la fonction végétale de la levure exerce sur le rendement en alcool, et d'une nouvelle interprétation du "pouvoir ferment." [The influence of the vegetative function of the yeast on the production of alcohol and a new interpretation of a ferment capacity.]** Bull. Assoc. Chimistes Sucrerie et Distillerie France et Colonies 37: 29–40. 1919.

1350. Schweizer, K. **Études chimico-physiologiques sur la cellule de levure. [Chemical and physiological studies on the yeast cell.]** Bull. Assoc. Chimistes Sucrerie et Distillerie France et Colonies 38: 163–171. 1920.

TEMPERATURE RELATIONS

1351. MacDougal, D. T. **A new high temperature record for growth.** Science 53: 370–372. 1921.—The author reports a new high temperature record for growth in *Opuntia*, and for the higher plants, of 55°C. (131°F.). The experiment is described.—*C. J. Lyon.*

1352. MacDougal, D. T., and Earl B. Working. **Another high temperature record for growth and endurance.** Science 54: 152–153. 1921.—Joints of *Opuntia* grew with a tissue temperature of 56.5°C. in air having a temperature of 58°C.—*C. J. Lyon.*

1353. Munerati, O. **L'influenza delle basse temperature sulla germinazione del frumento appena raccolto e dei semi così detti freschi. [The influence of low temperatures on the germination of newly harvested grain.]** Atti R. Accad. Lincei Roma Rend. (Cl. Sci. Fis. Mat. e Nat.) 29^{2}: 273–275. 1920.—Newly thrashed grain was germinated at different temperatures, and the results confirm the work of Harrington, to the effect that germination is better at low temperatures.—*F. M. Blodgett.*

1354. Vass, A. F. **The influence of low temperature on soil bacteria.** Cornell Univ. Agric. Exp. Sta. Mem. 27: 1039–1074. 1919.—Sand and soil cultures of *Bacillus radicicola* when subjected to freezing at −15°C. and at −190°C. (the temperature of liquid air) give greater bacterial counts than the unfrozen, the increase being from 50 to nearly 200 per cent. This indicates a breaking up of the bacterial masses in frozen soils rather than an increase by growth and multiplication. The fact that the increased count in slowly thawed material was much less than in the quickly thawed cultures futher substantiates this view. The concentration of the medium, the time of exposure, and the degree of cold are the important factors in resistance to low temperature.—*R. S. Nanz.*

RADIANT ENERGY RELATIONS

1355. Buller, A. H. R. **Upon the ocellus function of the subsporangial swelling of Pilobolus.** Trans. British Mycol. Soc. 7: 61–64. 1921.—The subsporangial swelling of *Pilobolus* functions as an ocellus which receives the heliotropic stimulus which causes the stipe to turn the "fungus gun" toward the light. The swelling is transparent and refracts light like the bulb of an inverted Florence flask filled with water. When the incident rays of light strike the swelling in such a way that they are parallel with its long axis they are refracted through its walls and converge to form a spot of light at its base. Under these conditions there is physiological equilibrium and no heliotropic response. When, however, the light rays strike the swelling obliquely the spot of light is formed on one side of the wall and in such a case the stipe reacts by growing most rapidly on the side nearest the spot of light. This reaction continues until the spot of light has moved down to the position of equilibrium at the base of the swelling. A method of making a model for demonstrating this reaction of *Pilobolus* is described.—*W. B. McDougall.*

1356. Colin, M. H. **Action de la lumière sur la richesse saccharine de la betterave. [Action of light on the sugar content of the beet.]** Bull. Assoc. Chimistes Sucrerie et Distillerie France et Colonies 38: 61–74. 1920.—Beets grown in direct sunlight produced a greater tonnage than those in diffuse light but the sucrose content was lower.—*C. W. Edgerton.*

1357. Gardner, H. A. **Effect of colored light upon plant growth.** Sci. Amer. Monthly 2: 313. *Fig. 1–2.* 1920.—Preliminary experiments indicated a possible advantage in using certain colored, rather than white, lights in the sash of greenhouses.—*Chas. H. Otis.*

1358. Tjebbes, K., en J. C. Th. Uphof. **Der Einfluss des elektrischen Lichtes auf das Pflanzenwachstum. [The influence of electric light on plant growth.]** Landw. Jahrb. 56: 315–328. *Fig. 10.* 1921.—The experiments were made during the winter of 1919–20 in a greenhouse divided into 2 parts: In the 1st part the plants were under the influence of normal daylight; in the 2nd, under the influence of CO_2 and daylight, also CO_2 and daylight supplemented by electric light. The temperature in all cases was the same, the amount of CO_2 admitted from the cylinders was measured with a gas meter, and the electric light was furnished by bulbs of 200 candle power, burning from 10 p.m. to 6 a.m. Seeds of wheat, rye, flax, beans, peas, cabbage, beets, onions, *Linaria bipartita*, *L. reticulata*, *Theris coronaria*, and *Reseda odorata* germinated several days earlier when daylight was supplemented with electric light; the plants were darker green; contained more chloroplasts; and generally the intercellular spaces of the leaves were larger. As examples of the influence of the supplementary electric light the following are for bulbous plants: Tulips, requiring 29 days to develop in daylight, needed only 23 days under the conditions indicated; hyacinth 19 against 14 days; and crocus 22 against 13 days. Likewise twigs of *Ribes rubra* and *Cornus mas* flower sooner under electric light. Among red algae, *Ceramium rubrum* does not develop phycoerythrin under electric light; and among brown algae, *Ascophyllum nodosum* and *Ectocarpus* do not form phaeophyll. —*J. C. Th. Uphof.*

TOXIC AGENTS

1359. Bettinger, et Delaval. **Action des differents acides sur le Mucor végétal. [The effect of various acids on the vegetative condition of Mucor.]** Bull. Assoc. Chimistes Sucrerie et Distillerie France et Colonies 37: 254–261. 1920.

1360. Chambers, W. H. **Studies in the physiology of the fungi XI. Bacterial inhibition by metabolic products.** Ann. Missouri Bot. Gard. 7: 249–289. 1920.—Chambers found that the "growth and death of *Bacillus coli* in bouillon does not follow a constant curve" but depends on the P_H value of that medium. The fermentable carbohydrates of the medium are the particular components which control the active acidity. "Of the products of metabolism acid is the most inhibitory, checking growth slightly at P_H 5.5 and increasing in intensity to a lethal concentration between P_H 5.1 and 4.9. The first inhibition on the alkaline side is noted between P_H 7.0 and 7.6, depending on the age of the culture and other factors. P_H 7.6 is comparable in inhibitory action to P_H 5.1. In an asparagin-$CaCO_3$ bouillon, P_H 9.5 is not fatal." Other inhibitory metabolic products of dextrose are evident near the critical active acidity. "No metabolic product of the nature of an 'auto-toxin' could be found."—*S. M. Zeller.*

1361. Ciamician, G., e C. Ravenna. **Sull'influenza di alcune sostanze organiche sullo sviluppo delle piante. Nota V. [On the influence of some organic substances on the development of plants. Note V.]** Atti R. Accad. Lincei Roma Rend. (Cl. Sci. Fis. Mat. e. Nat.) 30^1: 3–7. 1921.—Continuing their work on the toxicity of various organic compounds on plants (see Bot. Absts. 5, Entry 2240; 6, Entry 1317; 7, Entries 2133, 2134; 10, Entries, 1341, 1342), the authors found that butyl amine induces an albinism though less pronounced than with isoamylamine and nicotine. In previous work it appeared that hydrogenation had an effect on the toxicity of compounds. To test this chinolin was compared with tetrahydrochinolin, phthalic acid with tetrahydrophthalic acid, and cymene with limonene. In each case the 2nd compound mentioned was more harmful than the 1st. In an attempt to study the effect of the length of the chain on the effect of the compound the fatty acids were taken up but no appreciable differences found. Some further tests were also made to determine the effect of additional methyl groups in substances in causing injuries to plants.—*F. M. Blodgett.*

1362. McCall, A. G., and J. R. Hoag. **The relation of the hydrogen-ion concentration of nutrient solutions to growth and chlorosis of wheat plants.** Soil Sci. 12: 69–77. *2 fig.* 1921. —Wheat plants were grown for 2 months in 4 different nutrient solutions each of which was

modified in such a way as to have 3 distinctly different P_H values, without materially altering the concentration of the essential ions. The hydrogen-ion concentration appreciably influenced the growth rate. The plants grown in solutions with a P_H of 4.2–7.0 suffered from chlorosis.—*W. J. Robbins.*

1363. MUTTKOWSKI, RICHARD A. **Copper in animals and plants.** Science 53: 453–454. 1921.—From incineration experiments the author reports that copper is found in traces in plants, and is "probably inactive."—*C. J. Lyon.*

1364. OSTERHOUT, W. J. V. **The mechanism of injury and recovery of the cell.** Science 53: 352–356. 1921.—By means of his electrical resistance method, the writer has developed a criterion for judging life and death in cells. From experiments with *Laminaria*, the facts "lead to the assumption that the resistance of the cells is proportional to a substance, M, formed and decomposed by a series of consecutive reactions." The series $O \rightarrow S \rightarrow A \rightarrow M \rightarrow B$ is considered as representing a series of reactions upon which life depends. The mathematical analysis of experimental curves leads to the conclusion that temporary injury is due to the loss of a substance, M. Permanent injury is due to the loss of a substance, O. Recovery may be complete or partial. Equations have been found that make it possible to predict true curves of injuries in both pure salt solutions and mixtures and recovery curves in sea water. Thus the theory is supported by quantitative proofs.—*C. J. Lyon.*

1365. SCHWEIZER, KARL. **L'action du cuivre sur la fermentation alcoolique. [The effect of copper upon alcoholic fermentation.]** Bull. Assoc. Chimistes Sucrerie et Distillerie France et Colonies 37: 160–173. *3 fig.* 1919.

MISCELLANEOUS

1366. JACOBSEN, J. P., ET M. KNUDSEN. **Manuel pratique de l'analyse de l'eau de mer. II. Dosage de l'oxygène dans l'eau de mer par la méthode de Winkler. [Practical manual for the analysis of sea water. II. The amount of oxygen in sea water by the Winkler method.]** Bull. Inst. Oceanograph. Monaco 390. *15 p.* 1921.

SOIL SCIENCE

J. J. SKINNER, *Editor*

F. M. SCHERTZ, *Assistant Editor*

(See also in this issue Entries 898, 914, 916, 953, 963, 964, 1251, 1260, 1354)

1367. BAUER, F. C. **The relation of organic matter and the feeding power of plants to the utilization of rock phosphate.** Soil Sci. 12: 21–41. 1921.—Experiments with mixtures of rock phosphate and organic matter, with provision for removal of soluble phosphate as formed, failed to show a solvent effect of the decaying organic matter on rock phosphate. In some cases mixtures of rock phosphate and decaying organic matter applied to pot cultures increased the growth of corn more than either alone. The growth of 15 kinds of plants on rock phosphate in sand cultures showed a wide variation in dry matter produced. There was no definite relation between amount of plant growth and extent of root system, phosphorous content or acidity of the plant juices. Sweet clover possesses remarkable feeding power toward rock phosphate and feldspar and for this reason is well suited to rotation.—*W. J. Robbins.*

1368. BURKILL, I. H. **Forests and their retention of rain water.** Gardens' Bull. Straits Settlements 2: 419–421. 1921.—A forest soil is porous. Peat soils in the Malay Peninsula shrink; soils from hill-forests may be washed away on exposure. The greater part of the article is a résumé of Arnold Engler's work on the subject in Switzerland (see Bot. Absts. 9, Entry 710). [See also Bot. Absts. 9, Entry 1232.]—*I. H. Burkill.*

1369. Elveden. **A contribution to the investigation into the results of partial sterilization of the soil by heat.** Jour. Agric. Sci. 11: 197–210. *9 fig.* 1921.—The effect of steaming soil at 100°C. for 1 hour was studied. Samples of soil in 2-inch layers down to 18 inches were used and crops grown over a period of 1–2 years, new series being set up every 3 weeks; data were obtained at all seasons of the year. The soils varied considerably, some being field soils which were much lower in organic material than others taken from gardens. Mustard was used in all the experiments; crops were grown in boxes. Curves and tables are given showing a considerable increase in yield for the steamed soils over those unsteamed, amounting in 1 series of garden soils to 603 per cent and in 1 of field soils to 403 per cent; the average increase for the 44 experiments was 235 per cent. Steaming proved more efficacious in the richer garden soils than in the poorer field soils. There was no indication that enemies of plants congregate at a certain depth according to the season of the year. Soils below the point previously disturbed by cultivation did not respond to the steaming. The benefit obtained from steaming extends over more than 1 cropping period. Various other methods of sterilising soil—flaming and electrical heating—were not so efficient. To test out Russell's theory of the action of soil protozoa, unsteamed soils were mixed with steamed soils in varying proportions, the protozoan fauna being thereby supposedly quickly re-introduced. The results all point to some other effect since the amount of yield varied rather directly with the amount of treated soil present. The author concludes that the principal effect of steaming soils is a direct one on the composition of the soils rather than the destruction of protozoa.—*V. H. Young.*

1370. Fisher, R. A. **Studies in crop variation I. An examination of the yield of dressed grain from Broadbalk.** Jour. Agric. Sci. 11: 107–135. *3 fig.* 1921.—A survey is made of the results of a statistical examination of the yield of plots of the Broadbalk wheat field at the Rothamsted Station for a period of 67 years. The results are treated from a mathematical point of view and an analysis made of the factors causing various types of variation over long periods of time. The author finds that "average wheat yields, even over long periods from different fields or for different seasons cannot approach in accuracy the comparison of plots of the same field in the same seasons."—*V. H. Young.*

1371. Fred, E. B. **The fixation of atmospheric nitrogen by inoculated soybeans.** Soil Sci. 11: 469–477. *Pl. 1–3.* 1921.—On Plainfield sand, inoculation increased the yield of Ito San soybeans more than 3 times and resulted in a net gain of 57 pounds of nitrogen per acre. Approximately 87 per cent of the total increase of nitrogen was in the soybean tops. Although the latter were removed the favorable effect of inoculation was noted in the growth of rye the following year.—*W. J. Robbins.*

1372. Fred, E. B., W. H. Wright, and W. C. Frazier. **Field tests on the inoculation of canning peas.** Soil Sci. 11: 479–491. *Pl. 1–3.* 1921.—Inoculation increased the yield and per cent of nitrogen in canning peas on a rich, silt loam soil, unlimed and acid, and on a neutral soil which had been heavily manured for several years. It had no effect on a slightly acid, heavy, rich, clay loam soil.—*W. J. Robbins.*

1373. Leach, B. R. **Experiments with hot water in the treatment of balled earth about the roots of plants for the control of Japanese beetle larvae.** Soil Sci. 12: 63–68. *1 fig.* 1921.—Hot water, because of its slowness and injury to the trees, cannot be used to control the grubs of the Japanese beetle.—*W. J. Robbins.*

1374. Leach, B. R., and J. W. Thomas. **Experiments in the treatment of balled earth about the roots of coniferous plants for the control of Japanese beetle larvae.** Soil Sci. 12: 43–61. *Pl. 1–2.* 1921.—The results of the toxicity of sodium sulphocarbonate, sodium ethyl xanthate, sodium cyanide, copper sulphate, potassium fluoride, camphor, carbon disulfide, thymol, mustard gas, and chloroform on naked *Popillia* grubs, on the grubs imbedded in soil, and on the roots of coniferous trees are reported.—*W. J. Robbins.*

1375. LIPMAN, J. G., AND A. W. BLAIR. **Nitrogen losses under intensive cropping.** Soil Sci. 12: 1–19. *Pl. 1–2, 1 fig.* 1921.—A study has been made of nitrogen losses from a loam soil and cylinders with natural drainage which for 20 years have been under a 5-year rotation of corn, oats (2 years), wheat, and timothy. Different forms of nitrogen were used alone and with farm manure. A complete record of the amount of nitrogen applied in the fertilizers and that removed by the crops has been kept. Also, nitrogen determinations were made on the original soil in 1907, 1912, and 1918. During the first 10 years the loss of nitrogen amounted to 103 pounds per acre annually; during the 3rd 5-year period it was the same; and during the 4th 5-year period there was a gain in some cylinders, due largely to the growth of legume crops. Carbon determinations made in 1918 show gains in carbon content for nearly all those cylinders that received both farm manure and commercial fertilizers.—*W. J. Robbins.*

1376. MCTAGGART, ALEXANDER. **The influence of certain fertilizer salts on the growth and nitrogen-content of some legumes.** Soil Sci. 11: 435–455. *Pl. 1.* 1921.—Alfalfa, Canada field peas, or soybeans were grown in the greenhouse in wooden boxes holding 128 pounds of soil, mostly sand low in plant nutrients. Nitrogen as dried blood, sodium acid phosphate, potassium chloride, calcium sulphate, or mixtures of the above, both limed and unlimed, were applied to the soil. At the end of growth the plants were dried and the total nitrogen determined. The nitrate content of the soil was also determined 3 weeks after harvest. Phosphorus, alone, increased the dry matter and total nitrogen decidedly and to a less extent the per cent of nitrogen. Nitrogen as a single element did not benefit the plants with respect to yield, nitrogen, or per cent of nitrogen. Combined nitrogen in the amount used did not hamper nitrogen assimilation. Potassium, used alone, increased the total nitrogen and dry matter of Canada field peas and alfalfa but not of soybeans; it increased the per cent of nitrogen in all 3 crops. Sulphur, alone, increased the growth and nitrogen of alfalfa but had no effect on the peas or soybeans. Where phosphorus was applied the greatest nitrate accumulation resulted after all crops. Nitrogen, alone, increased the nitrate accumulation after all 3 crops but with other elements it had no effect; potassium slightly inhibited it. Sulphur increased nitrification in soil which had grown alfalfa; this was not true in the case of peas and soybeans. In general there appears to be a correlation between dry matter produced and soil nitrification; this probably is due to the greater root system, which subsequently decays.—*W. J. Robbins.*

1377. MILLER, E. J., AND C. S. ROBINSON. **Studies on the acid amide fraction of the nitrogen of peat.** Soil Sci. 11: 457–467. 1921.—Attempts to separate glutaminic acid directly from the hydrolysate of peat failed. The application of Foreman's method (Biochem. Jour. 8: 463) resulted in the separation of both glutaminic and aspartic acids from this material and indicated the presence of pyrolidon carboxylic acid.—*W. J. Robbins.*

1378. SCHMIDT, E. W. **Torf als Energiequelle für stickstoffassimilierende Bakterien. [Peat as a source of energy for nitrogen-assimilating bacteria.]** Centralbl. Bakt. II Abt. 52: 281–289. 1920.—The author calls attention to the possibilities of utilizing peat deposits for increasing the nitrogen supply of soil. His investigations have shown that the cell-membrane substances of young sphagnum peat are attacked by cellulose bacteria and that the resulting cleavage products may serve as nutrients for azotobacters. It was also shown that these cell-membrane substances in their raw state are comparatively resistant to the attacks of the cellulose bacteria. This resistance may be largely overcome by grinding, steaming, or boiling. When hydrolyzed with dilute hydrochloric acid and subsequently neutralized, the resulting product forms a very desirable medium for the growth of azotobacters. To what extent peat can be used as a fertilizer, further experimentation must determine.—*Anthony Berg.*

1379. SEN-GUPTA, NAGENDRA NATH. **Dephenolization in soil.** Jour. Agric. Sci. 11: 136–158. *6 fig.* 1921.—Previous workers have shown that organisms isolated from the soil are capable of decomposing phenol, *p*-cresol, and other aromatic compounds *in vitro*. The author has studied the disappearance of phenol and the 3 cresols, especially *m*-cresol, from

several types of Rothamsted soils. He has elaborated colorimetric methods for the estimation of phenol and cresols which indicate an instantaneous loss of phenol followed by further loss, slower and different in character. Phenol and the 3 cresols disappear with more or less ease from all soils examined. The slow disappearance seems to be largely due to microorganisms though evidence is adduced to show that some non-biological factor is in part responsible. In soil autoclaved at 130°C. for 20 minutes no disappearance takes place, but the action proceeds slowly in the presence of considerable amounts of toluene or mercuric chloride. Soils partially sterilized by toluene, which is removed by evaporation, are dephenolized more rapidly than ordinary soils, but steaming does not result in such an increase in rate. Dephenolization takes place slowly in air-dried soils. It was found that successive doses of phenol or *m*-cresol disappeared at increasing rates—a result which is regarded as pointing to an action mainly biological in character. Two types of bacteria have been isolated from soil which are able to decompose phenol in culture solutions containing mineral salts and phenol, and a 3rd capable of decomposing *m*-cresol. Three types of dephenolization are recognized: A biological type, an instantaneous chemical or physical type, and a slower chemical or physical type; the mechanism of the latter 2 types has not been elucidated.—*V. H. Young.*

1380. Smith, R. S. **Some effects of potassium salts on soils.** Cornell Univ. Agric. Exp. Sta. Mem. 35. *567–605.* 1920.—The work was designed to show the effect of common fertiliser salts of potassium upon the growth of wheat plants and upon bacterial activities. Silt loam of the Hagerstown, DeKalb, and Volusia series were used; in some cases lime was applied. Data are presented on the grain and straw from crops grown upon the soil and from plants grown in water extracts of the soils. These indicate that potassium chloride became toxic at 1000 pounds per acre with Hagerstown soil and at 2000 pounds with DeKalb soil. Potassium sulphate increased growth in both of these soils and no toxicity was noted with an application of 3000 pounds per acre.—Under these treatments potassium chloride reduced the accumulation of nitrates, as determined by the phenol disulphonic method, while potassium sulphate exerted a stimulating effect on nitrification; in DeKalb soil the greatest stimulation occurred with 1000 pounds per acre. A study of the interchange of bases showed that both potassium chloride and potassium sulphate replaced calcium markedly. Manganese was replaced in very appreciable amounts in Hagerstown and DeKalb soil. The soil highest in water-soluble manganese showed the least nitrifying efficiency, the smallest growth of wheat in pot cultures, and the poorest growth of wheat rootlets in extract cultures. No iron or aluminum was found in any of the water extracts.—*J. K. Wilson.*

1381. Thomas, M. D. **Aqueous vapor pressure of soils.** Soil Sci. 11: 409–434. *5 fig.* 1921. —A dynamic method of measuring aqueous vapor-pressure lowerings of soil accurate to 0.01 mm. of mercury at 25°C. is described. The vapor-pressure-moisture curves are hyperbolae over a wide range of moisture contents. Correlations between the vapor pressure of the soil and the following properties are given: Hygroscopic coefficient, wilting coefficient, moisture equivalent, "solid water," capillary potential, surface tension, and curvature of the moisture surface.—*W. J. Robbins.*

1382. Turpin, H. W. **The carbon-dioxide of the soil air.** Cornell Univ. Agric. Exp. Sta. Mem. 32. *315–361.* 1920.—The CO_2 content of air in Dunkirk clay loam was studied by obtaining samples of the air by aspiration; after absorption of the CO_2 in Ba $(OH)_2$ the excess hydroxide was titrated with standard oxalic acid (the equivalent of the latter in terms of CO_2 having been determined by titrating with standard $KMnO_4$ solution). Two crops of oats and 1 of millet were grown in the soil, the latter contained in large cans; some cans were kept free from vegetation. The CO_2 content of the air from the cropped soil increased as the crops approached their greatest growing period; fluctuations were noted which were thought to be due largely to temperature and pressure variations. High pressures were accompanied by low CO_2 contents while high temperatures resulted in high CO_2 production. Some positive correlation seemed to exist between the amount of water percentage transpired and the per cent of CO_2; this was noted at a period during which the plant growth was most vigorous. From this and other data presented it is concluded that the increase in CO_2 in the cropped soil was due largely to the respiratory activities of the plant roots.—*J. K. Wilson.*

1383. WEIS, FR., OG K. A. BONDORFF. **Undersögelse af Skovjord under overnaerede graner i Lyngby Skov. [Investigation of soil underlying over-nourished spruce in Lyngby Forest.]** Forst. Forsögsv. Danmark 5: 343–352. *Pl. 1.* 1920.—A chemical examination was made of the soil underlying (1) over-nourished spruce (*Picea excelsa*), and (2) spruce of normal development. The soil of the former showed in grams per cubic meter of soil: total N 7184, $NaNO_3$ 19.9, CaO 2136, K_2O 475, and P_2O_5 476. In the soil of the normally developed spruce the amounts were: total N 1206, $NaNO_3$ 1.3, CaO 1340, K_2O 654, P_2O_5 218. The amount of nitrate in the soil of over-nourished spruce is much greater than in the other, and is 10 times as great as that ordinarily found in agricultural soil; it is considered the chief cause of the hypertrophy. This soil was further tested in the laboratory by adding $(NH_4)_2SO_4$ with and without $CaCO_3$, $(NH_4)_2CO_3$, KNO_3 with and without carbonate, peptone, and casein with and without carbonate. All tests except those with sterilized samples and those in which peptone alone was added showed increases in $NaNO_3$. The bacteria responsible for the nitrification have not been found; all attempts at inoculation have failed.—*J. A. Larsen.*

TAXONOMY OF VASCULAR PLANTS

J. M. GREENMAN, *Editor*

E. B. PAYSON, *Assistant Editor*

(See also in this issue Entries 870, 1046)

GENERAL

1384. ANONYMOUS. **Trees and shrubs of Mexico.** [Rev. of: STANDLEY, PAUL C. **Trees and shrubs of Mexico. Gleicheniaceae to Betulaceae.** Contrib. U. S. Nation. Herb. 23: 1–169. 1920 (see Bot. Absts. 8, Entry 744).] Nature 107: 603. 1921.

1385. ALBERTSON, ALICE O. **Nantucket wild flowers.** *Small 8vo., xlv + 442 p., illus.* G. P. Putnam's Sons: New York and London, 1921.—The author has carefully selected 300 species to represent the typical wild flower flora of Nantucket. The plants are popularly but reliably described under their scientific and common names and many of them are attractively illustrated, some being depicted in color. Interesting and valuable information, not hitherto of common knowledge, is recorded for a number of the species included in the work.—*J. M. Greenman.*

1386. BRITTON, C. E. **Report of the distributor for 1917.** Bot. Soc. and Exchange Club British Isles Rept. 5: 205–262. 1917 [1918].—Specimens distributed 6222.—*G. C. Druce.*

1387. CLEGHORN, H. **General index of the plants described and figured in Dr. Wight's work entitled "Icones Plantarum Indiae Orientalis."** *4 to, 68 p.* Bernard Quaritch, Ltd.: London, 1921.—This publication, as the title indicates, is an alphabetical index to the genera and species figured in Wight's illustrations of East Indian plants. It renders possible ready reference to 2101 illustrations published in that work.—*J. M. Greenman.*

1388. [DRUCE, G. CLARIDGE.] [Rev. of: WILLIS, J. C. **A dictionary of the flowering plants and ferns.** *4th ed. vii + 701 p.; suppl. liv p.* Cambridge Univ. Press: 1919.] Bot. Soc. and Exchange Club British Isles Rept. 5: 617–618. 1919 [1920].

1389. GAUMÉ, J. [Rev. of: KOPS, JAN, F. W. VAN EEDEN, EN L. VUYCK. **Flora Batava. Afbeelding en Beschrijving der Nederlandische Gewassen.** *402–405 Aflevering, pl.* 2001–2016. Martinus Nijhoff:'s-Gravenhage, 1920 (see Bot. Absts. 8, Entry 1541).] Rev. Gén. Bot. 33: 397. 1921.

1390. GREYERZ, HANS VON. **Die hohe Eibe von Chillon. [The tall yew of Chillon.]** Schweiz. Zeitschr. Forstw. 72: 146–147. *1 pl.* 1921.—The yew is a memorable tree because, in former days, it was planted upon the grave as a symbol of immortality. The specimen de-

scribed stands in the state forest of Chillon at an elevation of 700 m. with a circumference of 1.82 m. at breast height, and a height of 21.5 m. During the last 16 years its average growth per year has been 4.4 mm. in diameter and 6–7 cm. in height. Other yew trees of greater diameter are known but the tallest recorded, aside from the Chillon yew, is 19 m.—*J. V. Hofmann.*

1391. GUNDERSEN, ALFRED. **Plant families: a plea for an international sequence.** New Phytol. 19: 264–271. 1920.—Several proposed classifications are quoted and the following summary is given: " 1. A periodic inventory of facts and opinions which appear to have a bearing on the sequence of families, especially of living vascular plants, is to be greatly desired. 2. Where facts are not conclusive the definite goal of a truly international sequence should be sought through agreement. 3. Standard numbers as part of symbols for plant families, revised at suitable intervals, would serve important practical purposes, especially in the co-ordination of information."—*I. F. Lewis.*

1392. HAYATA, BUNZO. **The natural classification of plants according to the dynamic system.** Icones Plantarum Formosanarum 10: 97–234. 1921.—The author proposes an arrangement of the families of flowering plants that is subject to change according to the viewpoint of the systematizer. This is in direct opposition to the prevalent view that regards only one natural system of classification possible since only one phylogenetic tree is possible. Species, genera, and families have changeable positions according to the criteria of comparison and it is neither natural nor necessary that a species should in all cases be placed between the same limits. Rather it should be placed between certain limits according to one view and between other limits according to another view. The inter-relationships of plants are to be expressed rather by the complications of a net than by the serial order of the branches of a tree. The resemblance of individuals or species is not confined to cases of blood-relationship but is manifested by the constitutional relationship. All individuals possess innumerable genes or factors. The individuals assume various forms according to the particular genes that are potent or latent and according to the different relations or segregations of potent genes. The relation of one individual to the others in phenomenal appearance is the relation of the mutual participation or sharing of potent or latent genes in individuals. As genes change so change individuals. Actual or blood relationship is only one phase of the dynamic system. If organisms are very similar in their external forms they should be taken into the same group. The author contrasts in great detail his dynamic system with the static one of Engler. That author's sequence is used as a framework and grouped about the families are arranged the other families that, in one way or another, are related to them. Another order rather than Engler's could have been used as a framework with equal value. Engler's sequence is recapitulated and under each family is discussed its relationships with other families.—*E. B. Payson.*

1393. HITCHCOCK, A. S. **Report of the Committee on Nomenclature of the Botanical Society of America.** Science 53: 312–314. 1921.—The committee of 9 members presents a code of rules. It suggests that, because the code invites international support, the judicial body should be an international commission and that this code be recommendations to it.—*C. J. Lyon.*

1394. R[OPER], I. M. [Rev. of: HAYWARD, IDA, AND G. CLARIDGE DRUCE. **The adventive flora of Tweedside.** *xxxii + 296 p.* T. Buncle & Co.: Arbroath, 1919.] Bot. Soc. and Exchange Club British Isles Rept. 5: 596–597. 1919 [1920].

SPERMATOPHYTES

1395. BENNETT, ARTHUR. **Atriplex calotheca: a correction.** Jour. Botany 59: 77. 1921. —The plant so listed in Jour. Bot. 58: 295. 1920 is not that species and the record is withdrawn.—*K. M. Wiegand.*

1396. BENOIST, RAYMOND. **Contribution à l'étude de la flore de la Guyane française. [Contribution to the study of the flora of French Guiana.]** Bull. Mus. Hist. Nat. [Paris] 26: 351–357. 1920.—Miscellaneous notes are given concerning various species of the Samydaceae, Turneraceae, Passifloraceae, and Caricaceae of French Guiana. Exsiccatae are cited. *Casearia Martini* and *C. umbellifera* are described as new.—*E. B. Payson.*

1397. BENOIST, RAYMOND. **Descriptions d'espèces nouvelles d'Hypoestes de Madagascar. [Descriptions of new species of Hypoestes from Madagascar.]** Bull. Mus. Hist. Nat. [Paris] 26: 262–266. 1920.—The following species are described as new: *Hypoestes Decaryana, H. cruenta, H. Viguieri, H. setigera,* and *H. longituba.*—*E. B. Payson.*

1398. BENOIST, RAYMOND. **Plantes récoltées par M. Wachenheim en Guyane française. [Plants collected by M. Wachenheim in French Guiana.]** Bull. Mus. Hist. Nat. [Paris] 26: 555–560. 1920.—The author gives a list of 67 species collected in the region of Maroni, near the convict camp of Godebert. *Duroia plicata* and *Maripa scandens* Aubl. var. *argentea* are described as new to science.—*E. B. Payson.*

1399. BLAKE, S. F. **Revisions of the genera Acanthospermum, Flourensia, Oyedaea, and Tithonia.** Contrib. U. S. Nation. Herb. 20: 383–436. *Pl. 23.* 1921.—Under this title 4 papers are included, being revisions of the 4 genera of American *Asteraceae* named in the title. In the first 8 species of *Acanthospermum* are described and the fruit of each illustrated, as well as the floral details of the type species of the genus, A. *australe.* In the 2nd 23 species of *Flourensia* are described. The 3rd paper describes the 13 known species of *Oyedaea,* one of which is of doubtful status. The 4th describes the 10 known species of *Tithonia.* In each paper the history of the group is briefly considered, followed by a technical description of the genus, and keys to and descriptions of the species. The following new names occur: *Acanthospermum* section *Lecocarpopsis, A. Donii, A. simile, A. consobrinum; Flourensia hirta, F. polyclada, F. Niederleinii, F. oolepis, F. leptopoda, F. angustifolia* (DC.) Blake; *Oyedaea scaberrima* (Benth.) Blake, *O. wedelioides* (Klatt) Blake, *O. reticulata, O. Rusbyi, O. lanceolata* (Rusby) Blake, *O. trachyphylla; Aspilia cupulata* (*Oyedaea angustifolia* Gardn.), *A. Bonplandiana* (Gardn.) Blake; *Tithonia calva lancifolia* (Robins. & Greenm.) Blake, *T. diversifolia glabriuscula.*—*S. F. Blake.*

1400. BROWN, N. E. **A new book on Cactaceae.** [Rev. of: BRITTON, N. L., AND J. N. ROSE. The Cactaceae. Vol. 2. Carnegie Inst. Washington Publ. 248. *vii + 239 p., 40 pl.* 1920 (see Bot. Absts. 7, Entry 2194).] Nature 107: 580–581. 1921.—The work is regarded as the first in English giving a complete account of the order and is much in advance of the German works on these plants. Failure to mention exceptions in the keys is pointed out as a fault.—*O. A. Stevens.*

1401. BUSCALIONI, LUIGI, E GIUSEPPE MUSCATELLO. **Studio monografico sulle specie americane del Gen. "Saurauia" Willd. [Monograph of American species of the genus Saurauia Willd. (Continued).]** Malpighia 28: 473–488. 1920.—The species *Saurauia pseudopedunculata* Busc. n. sp., *S. barbigera* Hook., and *S. Waldheimia* Busc. n. sp. are discussed in this number.—*Edith K. Cash.*

1402. CAILLE, O., ET H. POISSON. **Note sur la culture en plein air de quelques Ehretia et sur l'histoire des espèces horticoles de ce genre. [Note on the culture in the open air of some Ehretias and on the history of the horticultural species of this genus.]** Bull. Mus. Hist. Nat. [Paris] 26: 578–581. 1920.

1403. CAMUS, AIMÉE. **Note sur la synonymie et la repartition geographique de quelques Themeda. [Note on the synonymy and geographical distribution of some Themedas.]** Bull. Mus. Hist. Nat. [Paris] 26: 423–428. 1920.—The present paper treats those species of *Themeda* not considered in a recent paper by the same author. Specimens are cited, synonyms are given, and the geographical distribution indicated for the various species. A dichotomous

key is given for the subspecies and varieties of *T. gigantea*. The following new combinations, new varieties, and new subspecies are proposed: *Themeda laxa* (*Anthistiria laxa* Anderss.) *T. strigosa* (*Anthistiria strigosa* Ham.), *T. ciliata* Hack. subsp. *genuina*, *T. ciliata* Hack., subsp. *chinensis*, *T. ciliata* Hack. subsp. *Helferi* (*T. Helferi* Hack.), *T. Thwaitesii* (*Anthistiria Thwaitesii* Hook. f.), *T. anathera* Hack. var. *genuina*, *T. anathera* Hack. var. *major*, *T. anathera* Hack. var. *glabra*, *T. Hookeri* (*Anthistiria Hookeri* Griseb.), *T. gigantea* Hack. var. *intermedia* (*T. gigantea* Hack. subsp. *intermedia* var. *intermedia* Hack.), *T. gigantea* Hack. var. *dubia* (*T. gigantea* Hack. subsp. *intermedia* var. *dubia* Hack.).—*E. B. Payson.*

1404. Camus, Aimée. **Note sur le genre Themeda Forsk. (Graminées). [Note concerning the genus Themeda.]** Bull. Mus. Hist. Nat. [Paris] 26: 266–273. 1920.—A dichotomous key is given to the 11 recognized species of *Themeda*. A similar key is also given to the 13 varieties of *T. triandra*. Synonyms are given for the varieties and specimens are cited. The following new varieties and varietal combinations are proposed: *Themeda arguens* Hack. var. *genuina*, *T. triandra* Forsk. var. *vulgaris* (*T. Forskalii* Hack. var. *vulgaris* Hack.), *T. triandra* Forsk. var. *imberbis* (*T. Forskalii* Hack. var. *imberbis* Hack.), *T. triandra* Forsk. var. *mollissima* (*T. Forskalii* Hack. var. *mollissima* Hack.), *T. triandra* Forsk. var. *argentea* (*T. Forskalii* Hack. var. *argentea* Hack.), *T. triandra* Forsk. var. *Roylei*, *T. triandra* Forsk. var. *punctata* (*T. Forskalii* Hack. var. *punctata* Hack.), *T. triandra* Forsk. var. *glauca* (*T. Forskalii* Hack. var. *glauca* Hack.), *T. triandra* Forsk. var. *Burchellii* (*T. Forskalii* Hack. var. *Burchellii* Hack.), *T. triandra* Forsk. var. *syriaca* (*T. Forskalii* Hack. var. *syriaca* Hack.), *T. triandra* Forsk. var. *brachyantha* (*T. Forskalii* Hack. var. *brachyantha* Hack.), *T. triandra* Forsk. var. *major* (*T. Forskalii* Hack. var. *major* Hack.), *T. triandra* Forsk. var. *cerifera*.—*E. B. Payson.*

1405. Camus, Aimée. **Notes sur quelques Cymbopogon odorants (Graminées). [Notes on some fragrant Cymbopogons (Gramineae).]** Bull. Mus. Hist. Nat. [Paris] 26: 562–566. 1920. —Notes are given concerning species and varieties treated by Hackel under the name of *Andropogon Schoenanthus* L. The following new species and new combinations are proposed: *Cymbopogon annamensis* (*C. Martini* var. *annamensis* Camus), *C. mekongensis*, *C. bassacensis*, *C. nervatus* (*Andropogon nervatus* Hochst.), *C. densiflorus* (*Andropogon densiflorus* Steudel). The variety *traninhensis* of *C. confertiflorus* Stapf is also described. All the plants considered in this paper are fragrant and contain an essential oil.—*E. B. Payson.*

1406. Camus, Aimée. **Un Andropogon nouveau de l'Asie orientale. [A new Andropogon from eastern Asia.]** Bull. Mus. Hist. Nat. [Paris] 26: 561. 1920.—*Andropogon Thorelii* is described as new.—*E. B. Payson.*

1407. Camus, Aimée. **Une espèce nouvelle de bambon. [A new species of bamboo.]** Bull. Mus. Hist. Nat. [Paris] 26: 567. 1920.—*Gigantochloa cochinchinensis* is described as new to science.—*E. B. Payson.*

1408. Cardot, J. **Notes sur les espèces asiatiques du genre Photinia, section Pourthiaea (Rosacées). [Notes on the Asiatic species of the genus Photinia, section Pourthiaea (Rosaceae).]** Bull. Mus. Hist. Nat. [Paris] 26: 568–571. 1920.—Extensive notes are given concerning several species of *Photinia*. The following new combinations are made: *Photinia Calleryana* (*Pourthiaea Calleryana* Dcne.), *P. cotoneaster* (*Pourthiaea cotoneaster* Dcne.), *P. fokienensis* Franch. mss. (*Photinia glabra* var. *fokienensis* Franch.).—*E. B. Payson.*

1409. Choux, P. **Une nouvelle Asclépiadacée aphylle du nord-ouest de Madagascar. [A new leafless Asclepiad from northwestern Madagascar.]** Compt. Rend. Acad. Sci. Paris 172: 1308–1311. 1921.—An extended discription of this new plant is given. It is placed in the tribe *Cynanchineae* and named **Nematostemma** (n. gen.); one species is characterized, namely, *N. Perrieri*.—*C. H. Farr.*

1410. DANGUY, P. **Contribution à l'étude de la flore forestière de Madagascar.** [**Contribution to the study of the forest flora of Madagascar.**] Bull. Mus. Hist. Nat. [Paris] **26:** 252–253. 1920.—*Tisonia Faucherei* and *Turraea Thouvenotii* are described as new to science. —*E. B. Payson.*

1411. DANGUY, PAUL. **Lauracées de la forêt d'Analamazaotra (Madagascar).** [**Lauraceae from the forest of Analamazaotra (Madagascar).**] Bull. Mus. Hist. Nat. [Paris] **26:** 547–550. 1920.—Fifteen species of this family are known to occur in this forest. Of these, 6 are here described as new and 2 others redescribed in part. The following new names and new combinations occur: *Ravensara ferruginea*, *R. crassifolia* (*Cryptocarya crassifolia* Bak.), *R. latifolia*, *R. ovalifolia*, *R. cryptocaryoides*, *R. anisata*, and *R. Thouvenotii.*—*E. B. Payson.*

1412. EVANS, A. H. **On Geranium purpureum Vill. and G. Robertianum L.** Bot. Soc. and Exchange Club British Isles Rept. **5:** 724–729. 1919 [1920].

1413. GAMBLE, J. S. **Flora of the Presidency of Madras.** Part IV. *579–768.* Adlard and Son and West Newman: London, 1921.—This part includes the families Rubiaceae to Ebenaceae ending with a description of the genus *Diospyros*. The following new combinations are recorded: *Oldenlandia nitida* (*Hedyotis nitida* W. & A.), *O. caerulea* (*Hedyotis caerulea* W. & A.), *O. articularis* (*Hedyotis articularis* Br.), *O. sisaparensis* (*Hedyotis sisaparensis* Gage), *O. albo-nervia* (*Hedyotis albo-nervia* Bedd.), *Randia Brandisii* (*R. tomentosa* W. & A., not Bl.), *Tricalysia sphaerocarpa* (*Diplospora sphaerocarpa* Hook. f.), *T. apiocarpa* (*Diplospora apiocarpa* Hook. f.), *Plectronia ficiformis* (*Canthium ficiforme* Hook. f.), *Pavetta zeylanica* (*P. hispidula* var. *zeylanica* Hook. f.), *Stylocoryne lucens* (*Webera lucens* Hook. f.), *S. canarica* (*Webera canarica* Hook. f.), *S. nilagirica* (*Webera nilagirica* Hook. f.), *Anaphalis subdecurrens* (*Gnaphalium subdecurrens* DC.), *A. Lawii* (*A. oblonga* DC. var. *Lawii* Hook. f.), *Campanula Wightii* (*C. ramulosa* Wt., not Wall.), and *Isonandra montana* (*I. Wightiana* A. DC. var. *montana* Thw.).—*J. M. Greenman.*

1414. GUILLAUMIN, A. **Contribution à la flore de la Nouvelle-Caledonie.** [**Contribution to the flora of New Caledonia.**] Bull. Mus. Hist. Nat. [Paris] **26:** 254–261, 361–368, 434–435. 1920.—XXXI (254–261). Various species collected by M. Franc in New Caledonia are listed and the following new species are described: *Uvaria Baillonii*, *Pittosporum hematomallum*, *P. pronyense*, *P. sylvaticum*, *Sterculia Francii*, *Antholoma haplopoda*, *Sarcomelicope argyrophylla.* XXXII (361–368). Species collected by various collectors are listed. The species of *Agation* and *Pittosporum* are differentiated by means of dichotomous keys. XXXIII (434–435). The list of species collected by various authors is continued.—*E. B. Payson.*

1415. GUILLAUMIN, A. **Les espèces cultivées du genre Listrostachys (Orchidacées-Sarcanthées).** [**The cultivated species of the genus Listrostachys (Orchidaceae-Sarcantheae).**] Bull. Mus. Hist. Nat. [Paris] **26:** 574–577. 1920.—Notes are given concerning the origin of 34 species of this genus that have been introduced into cultivation.—*E. B. Payson.*

1416. HAINES, H. H. **Notes on Bridelia.** Jour. Botany **59:** 188–193. 1921.—The conclusion reached in the study of Indian species of *Bridelia* is that *B. montana* Hook. f. is not *B. montana* Willd. but a new species, *B. verrucosa*. *B. montana* Willd. is a widely distributed species including 3 varieties, one of which is new, *B. montana* var. *Stapfii.*—*S. H. Burnham.*

1417. HOEHNE, F. C. **Leguminosas forrageiras do Brasil, I. Meibomia Moehr.** [**Leguminous forage plants of Brazil, I. Meibomia Moehr.**] Anex. Mem. Inst. Butantan 1^1: 5–54. *Pl. 1–21, 3 photo.* 1921.—A brief résumé is given of the nomenclatorial history of *Meibomia*. This name, which was proposed exactly 50 years before *Desmodium* Desv., is accepted as valid. A synoptical key contrasts briefly the characters of the 24 recognized Brasilian species. Each of these species is described in detail and information given as to its geographical distribution. The forage value is indicated for certain species. The following new combinations are made: *Meibomia cajanifolia* (*Desmodium cajanifolium* DC.), *M. cuneata* (*Desmodium cuneatum* Hook. & Arn.), *M. discolor* (*Desmodium discolor* Vog.), *M. leiocarpa* (*Hedysarum leiocarpum* Spreng.), *M. aspera* (*Hedysarum asperum* Desv.), *M. triflora* (*Hedysarum triflorum* DC.),

M. bracteata (*Desmodium bracteatum* Mich.), *M. barbata* (*Nicolsonia barbata* DC.), *M juruensis* (*Desmodium juruense* Hoehne), *M. axillaris* (*Hedysarum axillare* Swartz), *M. adscendens* (*Desmodium adscendens* DC.), *M. uncinata* (*Desmodium uncinatum* DC.), *M. lunata* (*Desmodium lunatum* Huber), *M. incana* (*Hedysarum incanum* Swartz), *M. albiflora* (*Desmodium albiflorum* Salzm.), *M. mollis* (*Hedysarum molle* Vahl.), *M. physocarpa* (*Desmodium physocarpos* Vog.), *M. spiralis* (*Desmodium spirale* DC.), *M. platycarpa* (*Desmodium platycarpum* Benth.), *M. pachyrhiza* (*Desmodium pachyrhizum* Vog.), *M. sclerophylla* (*Desmodium sclerophyllum* Benth.), *M. subsecunda* (*Desmodium subsecundum* Vog.), *M. venosa* (*Desmodium venosum* Vog.).—*E. B. Payson.*

1418. Holm, Theo. **Studies in the Cyperaceae. XXIX. Carices Aerostachyae: Salinae Fries.** Amer. Jour. Sci. **49**: 429–442. *8 fig.* 1920.—The author presents a detailed discussion of the species of *Carex* which were referred to the groups *Aerostacyae* Drejer and *Salinae* Fries.—*T. J. Fitzpatrick.*

1419. Holm, Theo. **Studies in the Cyperaceae. XXX. Carices Aerostachyae: Cryptocarpae nob.** Amer. Jour. Sci. **50**: 159–168. *14 fig.* 1920.—This article is concerned with a critical and detailed study of *Carex cryptocarpa* C. A. Mey. and its immediate allies.—*T. J. Fitzpatrick.*

1420. Jahandiez, E. **Les Euphorbes cactoïdes du nord-ouest de l'Afrique. [The cactus-like Euphorbias of northwest Africa.]** Rev. Gén. Bot. **33**: 177–182. *Pl. 39–41.* 1921.—*Euphorbia canariensis L.*, *E. resinifera* Berg. & Schmidt, *E. Beaumierana* Hook. f. & Coss., and *E. Echinus* Hook. f. & Coss. are redescribed and the first 3 figured.—*J. C. Gilman.*

1421. Lecomte, Henri. **Eberhardtia, genre nouveau de la famille des Sapotacées. [Eberhardtia, a new genus of the Sapotaceae.]** Bull. Mus. Hist. Nat. [Paris] **26**: 345–348. *1 fig.* 1920.—The author describes **Eberhardtia**, a new genus, and refers to it 3 species from southeastern Asia. The new species and new combinations are as follows: *E. tonkinensis* (generic type), *E. Krempfii*, and *E. aurata* (*Planchonella aurata* Pierre). The new genus is to be placed near *Bumelia* but closer to *Monniera* and *Lecomtedoxa.*—*E. B. Payson.*

1422. Lecomte, Henri. **Faucherea: genre nouveau de la famille des Sapotacées. [Faucherea; a new genus of the Sapotaceae.]** Bull. Mus. Hist. Nat. [Paris] **26**: 245–251. *Fig. 1–4.* 1920.—A new genus of Madagascan trees is characterized and its 4 known species are described and illustrated. It differs from *Labourdonnaisia* by the isomery of the floral envelopes and by the presence of definite staminodia. The calyx resembles that of *Palaquium* but the staminodia serve to distinguish the new genus. **Faucherea** is without doubt closely related to the American genus *Achras*, from which it may be separated by the 6 (instead of 12) cells of the ovary. The absence of appendages to the corolla lobes does not permit of its confusion with *Manilkara.* The following new combinations and new species are proposed: *Faucherea hexandra* (*Labourdonnaisia hexandra* H. Lec.), *F. Thouvenotii*, *F. laciniata*, and *F. parvifolia.* —*E. B. Payson.*

1423. Lecomte, Henri. **Une Sapotacée nouvelle du Congo. [A new sapotaceous plant from the Congo.]** Bull. Mus. Hist. Nat. [Paris] **26**: 534–539. *Fig. 1–2.* 1920.—A new species of *Mimusops*, *M. Le Testui*, is described and illustrated, and a new section, *Autranella*, proposed to contain it.—*E. B. Payson.*

1424. Maiden, J. H. **A critical revision of the genus Eucalyptus.** Vol. V, pt. 6. *161–185, pl. 188–191.* William Applegate Gullick: Sydney, May, 1921.—The present part contains descriptions, synonymy, notes, and illustrations of the following species: *E. tetragona* F. v. M., *E. eudesmioides* F. v. M., *E. ebbanoensis* Maiden sp. nov., *E. Andrewsi* Maiden, *E. angophoroides* Baker, *E. kybeanensis* Maiden & Cambage, *E. eremophila* Maiden, and *E. decipiens* Endl.—*J. M. Greenman.*

1425. PEARSALL, WILLIAM HARRISON. Hagstrom's critical researches on the Potamogetons. Bot. Soc. and Exchange Club British Isles Rept. 5: 701–713. 1919 [1920].

1426. PELLEGRIN, F. De quelques Macrolobium (Légumineuses-Césalpiniées) du Gabon. [Concerning some Macrolobiums (Leguminosae-Caesalpineae) of Gabun.] Bull. Mus Hist. Nat. [Paris] 26: 551–554. 1920.—Three new species of *Macrolobium* are described, *M. limosum*, *M. mayombense*, and *M. Klainei*.—*E. B. Payson.*

1427. PELLEGRIN, F. Le bombi du Gabon, Parinarium Sargosii Pellegrin (Rosacées-Chrysobalanées). [The bombi of Gabun, Parinarium Sargosii Pellegrin (Rosaceae-Chrysobalaneae).] Bull. Mus. Hist. Nat. [Paris] 26: 349–350. 1920.—*Parinarium Sargosii* is described as new to science. This is a valuable timber tree of western Africa, known locally as "bombi," of which a large amount is available to commerce.—*E. B. Payson.*

1428. POISSON, H. Contribution à l'histoire des Nepenthes malgaches. [Contribution to the history of the Madagascan Nepenthes.] Bull. Mus. Hist. Nat. [Paris] 26: 436–440. *1 pl.* 1920.—Information is given concerning the introduction of *Nepenthes madagascarensis* Poir. and *N. Pervillei* Blume into France.—*E. B. Payson.*

1429. SCHLECHTER, R., E F. C. HOEHNE. Contribuições ao conhecimento das Orquidaceas do Brasil I. [Contributions to the knowledge of the Orchidaceae of Brazil I.] Anex. Mem. Inst. Butantan 1[2]: 5–48. *Pl. 1–11, 1 photo.* 1921.—This paper is the first of a series on the orchid flora of Brazil that the authors propose to publish from time to time. The species considered in more or less detail in the present paper were mostly collected in São Paulo and Minas Gerais. Synonyms and exsiccatae are cited. The authors desire communications concerning Brazilian orchids. A brief review is given of the present status of knowledge of the orchid flora of various parts of Brazil and South America. The following new species and new combinations are made: *Habenaria Hoehnei* Schl., *H. Gehrtii*, *H. butantanensis*, *H. melanopoda*, *H. pleiophylla*, *H. minarum*, *Sarcoglottis butantanensis* (*Spiranthes butantanensis* Hoehne), *Lyroglossa Griesebachii* Schl. (*Spiranthes Griesebachii* Cogn.), *Stelis pauloensis*, *S. inaequisepala*, *Pleurothallis albipetala*, *Epidendrum minarum*, *Cyrtopodium falcilobum*, *C. lissochiloides*, *Maxillaria Hoehnei* Schl.—*E. B. Payson.*

1430. STANDLEY, PAUL CARPENTER. Rubiales. Rubiaceae (pars). North Amer. Flora 32: 87–158. 1921.—In continuation of his treatment of this family the author presents a revision of 40 genera with generic and specific descriptions, keys, and the citation of synonyms. The following new species are described and new combinations made: *Pinarophyllon bullatum*, *Deppea Purpusii*, *D. excelsa* (*Psychotria excelsa* HBK.), *Bouvardia bouvardioides* (*Hedyotis bouvardioides* Seem.), *B. tenuifolia*, *B. subcordata*, *B. villosa*, *B. macrantha*, *B. heterophylla*, *B. quinquenervata*, *B. Rekoi*, *B. dictyoneura*, *B. Rosei*, *B. induta* (*B. longiflora* var. *induta* Robinson), *B. Langlassei*, *B. erecta* (*Catesbaea erecta* DC.), *B. latifolia*, *Ravnia Pittieri*, *Hillia panamensis*, *Exostema crassifolium*, *E. Shaferi*, *E. velutinum*, *E. barbatum*, *E. indutum*, *Coutarea pterosperma* (*Portlandia pterosperma* Wats.), *Urceolaria involucrata* (*Fuchsia involucrata* Sw.), *Sommera subcordata*, *S. grandis* (*Petesia grandis* Bartl.), *Tontanea canescens* (*Coccocipsilum canescens* Willd.), *T. tenuis* (*Coccocipsilum tenue* Urban), *T. herbacea* (*Coccocipsilum herbaceum* Lam.), *T. hispidula*, *T. hirsuta* (*Coccocipsilum hirsutum* Bartl.), *T. pleuropoda* (*Geophila pleuropoda* Donn. Smith).—*E. B. Payson.*

1431. WILDEMAN, EM. DE. Notes sur quelques espèces congolaises du genre Ochna Schreb. [Notes on some species of the genus Ochna Schreb. from the Congo.] Rev. Zool. Africaine Suppl. Bot. 7: B29–B40 1919.—These species are difficult of determination because the flower and leaves often appear at different times. A complete revision of this genus is yet to be made. The author describes the new species and gives the habitat for all those that he reviews. The species treated are: *Ochna arenaria* De Wild. & Th. Durand, *O. Bequaerti* n. sp., *O. Buettneri*, Engler & Gilg, *O. congoensis* Gilg, *O. congoensis* var. *microphylla* Gilg, *O. Debeerstii* De Wild., *O. Gilgiana* Engler, *O. Gilletiana* Gilg, *O. Hocki* n. sp., *O. Hoffmanni*, *O. Homblei* n. sp., *O.*

ituriensis n. sp., *O. katangensis* De Wild., *O. Laurentiana* Engler ex De Wild. & Th. Durand, *O. manikensis* n. sp., *O. membranacea* Oliv., *O. multiflora* DC., *O. pulchra* Hook., *O. quanjensis* Buettn., *O. Sapini* n. sp., *O. Schweinfurthiana* Fr. Hoffm., *O. suberosa* n. sp., and *O. Welwitschii* Rolfe.—*Henri Micheels.*

1432. WILDEMAN, EM. DE. **Notes sur quelques espèces congolaises du genre Ouratea Aubl. [Notes on some species of the genus Ouratea Aubl. from the Congo.]** Rev. Zool. Africaine Suppl. Bot. 7: B41–B71. 1920.—The following species are discussed as to synonymy and habitat and the new species characterized: *Ouratea bracteata* Gilg, *O. brunneo-purpurea* Gilg, *O. bukobensis* Gilg, *O. Cabrae* Gilg, *O. coriacea* De Wild. & Th. Durand, *O. reticulata* var. *Schweinfurthii* Engler, *O. densiflora* De Wild. & Th. Durand, *O. Dewevrei* De Wild. & Th. Durand, *O. Dupuisi* (Van Tiegh.) Th. & Hel. Durand, *O. elongata* (Oliv.) Engler, *O. engama* n. sp., *O. Flamignii* n. sp., *O. floribunda* n. sp., *O. gentili* n. sp., *O. gymnoura* Gilg & Mildbr., *O. intermedia* De Wild., *O. laevis* De Wild. & Th. Durand, *O. ituriensis* Gilg & Mildbr., *O. latepaniculata* n. sp., *O. Laurenti* n. sp., *O. laxiflora* De Wild. & Th. Durand, *O. Ledermanniana* Engler, *O. likemiensis* n. sp., *O. longipes* (Van Tiegh.) Th. & Hel. Durand, *O. macrobotrys* Gilg, *O. Mildbraedii* Gilg, *O. pellucida* De Wild. & Th. Durand, *O. Poggei* (Engler) Gilg, *O. pseudospicata* Gilg, *O. Pynaerti* n. sp., *O. reticulata* (Pal. Beauv.) Engler, *O. affinis* (Hook.) Engler, *O. Arnoldiana* De Wild. & Th. Durand, *O. bracteolata* Gilg & Mildbr., *O. calophylla* Engler, *O. febrifuga* Engler & Gilg, *O. nigrioneura* Gilg, *O. refracta* De Wild. & Th. Durand, *O. rigida* n. sp., *O. subumbellata* Gilg, *O. Thonneri* De Wild., and *O. Vanderysti* n. sp.—*Henri Micheels.*

1433. WILDEMAN, EM. DE. **Sur quelques espèces congolaises de la famille des Sapotacées. [Concerning some species of the family Sapotaceae from the Congo.]** Rev. Zool. Africaine Suppl. Bot. 7: B1–B28. 1919.—The author is concerned principally with the genus *Omphalocarpum*, an endemic genus of tropical Africa. An analytic key is given that shows the relationship of the new species with those previously known. Descriptions of the following species are given: *Omphalocarpum Bequaerti* n. sp., *O. bohmanehense* De Wild., *O. Brieyi* n. sp., *O. injoloense* n. sp., *O. Lescrauwaeti* n. sp., *O. Lujae* n. sp., *O. Mortehani* n. sp., *O. pedicellatum* n. sp., *O. sankuruense* De Wild., *O. sphaerocarpum* n. sp., *Sersalisia Malchairi* n. sp., *Bakerisideroxylon Sapini* n. sp., *Chrysophyllum longifolium* n. sp., *C. Sapini* n. sp., *C. Brieyi* n. sp., **Bequaertiodendron** n. gen., *B. congolense* n. sp., *Tridesmostemon Claessensi* n. sp., *T. Mortehani* n. sp., *Mimusops Bequaerti* n. sp., *M. Boonei* n. sp. The habitats are also indicated for *Sideroxylon stipulatum* (Radlkf.) Engler, *Synsepalum dulcificum* Daniell, *S. longeacuminatum* De Wild., *Pachystela cinerea* var. *cuneata* (Radlkf.) Engler, *Chrysophyllum africanum* A. DC., *C. Lacourtianum* De Wild., *C. Laurenti* De Wild., and *Mimusops angolensis* Engler.—*Herni Micheels.*

MISCELLANEOUS, UNCLASSIFIED PUBLICATIONS

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S. F. TRELEASE, *Assistant Editor*

1434. ANONYMOUS. **Bureau Central de la Commission de la Méditerranée. [Central Bureau of the Commission of the Mediterranean.]** Bull. Commission Internat. Explor. Sci. Mer Méditerranée 6: 1–20. 1921.—Preliminary reports are presented of work done by various countries bordering on the Mediterranean.—*T. C. Frye.*

1435. ANONYMOUS. **Commission Internationale pour l'exploration scientifique de la Mer Méditerranée. [International Commission for the scientific exploration of the Mediterranean Sea.]** Bull. Commission Internat. Explor. Sci. Mer Méditerranée 4: 1–7. 1920.—A report is made on what the Greek committee proposes to do.—*T. C. Frye.*

1436. ANONYMOUS. **Proces-verbaux des Sous-Commissions. [Transactions of the Sub-Commissions.]** Bull. Commission Internat. Explor. Sci. Mer Méditerranée 2: 1–23. 1920.—The organization of the Central Bureau is given, with a statement of what it proposes to do. The work proposed for Spain and France by the committees from these countries is outlined.—*T. C. Frye.*

1437. ANONYMOUS. **The art of prolonging the life of plants.** Sci. Amer. Monthly 3: 117. 1921.

1438. ARTSCHWAGER, ERNST, AND E. M. SMILEY. **Dictionary of botanical equivalents.** *137 p.* Williams & Wilkins Co.: Baltimore, 1921.—A glossary of botanical terms and plant names in 2 alphabets, French-English and German-English. The German list is much more complete than the French, which covers only 10 pages as compared with 121 pages of the German. The latter includes common names of plants, followed by both the English common name and the scientific name. The French list includes no plant names.—The preface states that the editors have not attempted a complete compilation of French and German terms, but have aimed to produce a practical handbook with blank pages interleaved for inserting additions. It should be of service to users of foreign botanical literature, as it contains definitions of terms not found in the usual French and German dictionaries.—*E. R. Oberly.*

1439. BABE, E. **Coeficiente de digestibilidad del palmiche. [Coefficient of digestibility of the fruit of the royal palm.]** Rev. Agric. Com. y Trab. [Cuba] 4: 474–477. *2 fig.* 1921.

1440. BEVAN, W. **Wine making.** Cyprus Agric. Jour. 16: 8. 1921.—The author comments on the reception and value of a series of lectures on the art of wine making given by Assistant Inspector A. K. Klokaris to the vineyardists of the Island.—*W. Stuart.*

1441. HANSEN, ALBERT A. **Our disappearing wild plants.** Science 53: 178–180. 1921 [Illustrated address delivered before the Botanical Society of Washington, D. C.]—The author pleads for the perpetuation of the native flora by avoiding thoughtless destruction or commercial exploitation. He suggests that this be accomplished by enlisting the cooperation of the public through the agency of schools, churches, etc., rather than through legislation. Wild-life gardens and house gardens are also suggested.—*C. J. Lyon.*

1442. LE PLASTRIER, C. M. **Nature and the Naturalist.** Australian Nat. 4: 182–192. 1921.

1443. LILLIE, R. S. **The place of life in nature. How is it related to the cosmos, the greater part of which is non-living?** Sci. Amer. Monthly 3: 112–117. 1921. [Paper read at a meeting of the Royce Club, Harvard University, April 11, 1920. Reprinted from Jour. Phil. Psychol. and Sci. Methods 17: No. 18, Aug. 26, 1920.]

1444. MAGRINI, G. **Programme des recherches à exécuter par la Mission Italienne chargée de l'exploration scientifique des Détroits de Constantinople. [Program of research to be carried out by the Italian commission assigned the scientific exploration of the Dardanelles.]** Bull. Commission Internat. Explor. Sci. Mer Méditerranée 5: 1–20. 1921.

1445. MONACO, [PRINCE] ALBERT DE. **Discours sur l'ocean. [Lecture on the ocean.]** Bull. Inst. Oceanograph. Monaco 392. *16 p.* 1921. [French translation of the author's English lecture before the National Academy of Sciences at Washington, D. C., April 25, 1921.]

1446. OXNER, M., ET M. KNUDSEN. **Manuel pratique de l'analyse de l'eau de mer. I. Chloruration par la méthode de Knudsen. [A practical manual for the analysis of sea water. I. Chlorine determination by Knudsen's method.]** Bull. Commission Internat. Explor. Sci. Mer Méditerranée 3: 1–36. 1920.—Detailed instructions are given with calculations and examples.—*T. C. Frye.*

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1. *Annual Volumes.*—The former practice of issuing approximately 300-page volumes will be discontinued. Instead, beginning with Volume 11, single annual volumes will be issued in monthly numbers, the December number being devoted to the annual authors' and subject indexes. In making the transition, Volume 11 will unavoidably have but ten numbers (March-December inclusive).

2. *Subject Index for Volumes 1-10.*—Various causes have prevented the publication of subject indexes in accordance with the schedules announced in earlier numbers. In view of the transition to the annual volume basis it seemed best to extend this delay slightly and issue a single subject index for Volumes 1–10 inclusive. This index is now practically complete in manuscript form, and will be ready to print in the near future. As soon as the approximate manufacturing cost of this index can be determined, subscribers will be informed and given an opportunity to place orders for it.

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ENTRIES 1447-2066

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(See also in this issue Entries 1545, 1663, 1667, 1703, 1739, 1828, 1885, 1887, 1893, 1929, 1963, 1976, 1980, 1983, 1984, 1988, 1995)

1447. Anonymous. **Agricultural research.** Nature **107**: 781–732. 1921.—This is an abstract of an address, by Sir Daniel Hall at the Royal Society of Arts, dealing with agricultural organization in Great Britain.—*O. A. Stevens.*

1448. Anonymous. **Berichte der höheren staatlichen Gärtnerlehranstalt zu Dahlem, der höheren staatlichen Lehranstalt für Wein-, Obst- und Gartenbau zu Geisenheim a. Rh. und der höheren staatlichen Lehranstalt für Obst- und Gartenbau zu Proskau für die Rechnungsjahre 1918 und 1919. [Reports of the higher government gardeners school at Dahlem; of the higher government school for vineyard, fruit, and garden culture at Geisenheim on the Rhine, and the higher government school for fruit and garden culture at Proskau for the fiscal years 1918 and 1919.]** Landw. Jahrb. **56**: Ergänzungsband I. *337 p.* 1921.—There are separately paged reports from each of the above institutions, carrying respectively 76, 147, and 114 pages. In addition to financial and other administrative reports there are brief statements regarding practical and scientific investigations in vineyard, orchard, and garden culture, plant physiology and pathology, soil science, genetics, etc.—*A. J. Pieters.*

1449. Anonymous. **Cultivation and fertilizing. Bundaberg Field Day.** Australian Sugar Jour. **13**: 215–216. 1921.—A report is given of the experiments in operation at Margam, the local experiment station at Bundaberg. These demonstrated that in that region cane planted close together in rows 5 feet apart gave the greatest tonnage in comparison with (the same variety being used and the same treatment given) cane planted 6 and 7 feet apart. In connection with fertilizing, as far as this district is concerned, liming of the red soils had not shown adequate results either in the growth or the value of the cane produced. One plot to which green manure and 1 ton of lime had been applied produced at the end of 24 months a crop of 16.77 tons of D. 1135 cane per acre containing 2.39 tons C. C. S. (cured centrifugal sugar). Another plot, to which lime but no green manure had been given, yielded 15.88 tons of cane per acre, equaling 2.09 tons C. C. S. A 3rd plot, receiving neither lime nor green manure, gave 19.42 tons of cane, equivalent in sugar yield to 2.98 tons C. C. S.—*C. Rumbold.*

1450. Anonymous. **Falsificación de la semilla de alfalfa.** [**Adulteration of alfalfa seed.**] Bol. Agric. Provincia Buenos Aires 1[5]: 3–4. 1920.—Warning is given that alfalfa seed may be adulterated with seed of a weed, *Medicago denticulata*.—*John A. Stevenson.*

1451. Anonymous. **El pochote y su cultivo.** [**Kapok cultivation.**] Jalisco Rural 3: 441–445. 1921.—The cultivation and harvesting of kapok (*Ceiba* sp.) are discussed.—*John A. Stevenson.*

1452. Anonymous. **Grass and cotton.** Sci. Amer. Monthly 3: 62. 1921. [Abstract of an article in Color Trade Journal, Aug., 1920.]—This article tells of a Japanese grass, *Phyllospadix Scouleri*, used for fiber, which, mixed with cotton, makes a very strong thread.—*Chas. H. Otis.*

1453. Anonymous. **Notes on some South African raw materials. Products of farm and veld.** South African Jour. Indust. 4: 359–371. 1921.—Excepting the baobab and possibly the wattle, South Africa has no trees suitable and in sufficient quantities for paper making, but a number of grasses have been found suitable. These are *Cymbopogon hirtus*, *Themeda forskalii* var. *mollissima* Hack, Tambookie grass, *Sorghum halepense*, and *Andropogon hirtiflorus*. The chief fiber plants grown in the Union are *Cannabis sativa*, *Hibiscus cannabinus*, *Furcroya gigantea*, *Asclepias fruticosa*, *Sida rhombifolia*, *Sparmannia*, and *Sisal*. Possible sources of oils, waxes, gums, vegetable dyes, drugs, industrial alcohol, and tanning materials are also mentioned.—*E. M. Doidge.*

1454. Anonymous. **Trigos para simientes.** [**Seed wheat.**] Rev. Soc. Rural Cordoba [Argentina] 20: 4979–4989. 1920.—This is a discussion of the varieties of wheat adapted to Argentina.—*J. A. Stevenson.*

1455. Arana, Marcelino de. **Praderas artificiales en secano.** [**Artificial pastures for unirrigated lands.**] Bol. Agric. Téc. y Econ. [España] 12: 362–366, 433–435. 1920.—Alfalfa and other legumes are recommended for planting on dry lands.—*John A. Stevenson.*

1456. Arnim, von. **Vorrichtung zum Beizen des Saatgetreides.** [**Apparatus for treating seed grain.**] Mitteil. Deutsch. Landw. Ges. 36: 563–564. 1921.—The author calls attention to the fact that the various forms of apparatus for treating seed grain now on the market are expensive; he suggests a simpler form, which is described and illustrated.—*A. J. Pieters.*

1457. Baker, E. **Hop growing experiments in South Africa.** Jour. Dept. Agric. Union of South Africa 3: 27–43. *Pl. 1–14.* 1921.—Experiments in hop growing carried out at George during the past 3 years are described. It may now be definitely stated that hops can be grown satisfactorily in at least one part of South Africa and that hop growing may possibly develop into a staple industry.—*E. M. Doidge.*

1458. Balme, Juan. **No es indiferente elegir cualquier variedad de trigo para semilla.** [**Use care in selecting a wheat variety for planting.**] Rev. Agric. [Mexico] 6: 140–142. *4 fig.* 1921.—The importance of selecting a variety of wheat adapted to the locality in which it is to be grown is emphasized.—*John A. Stevenson.*

1459. Bornemann, O. Lemmermann, Gerlach, und Friedr. Riedel. **Zur Kohlenstofferährung der Kulturpflanzen.** [**Concerning carbon nutrition of cultivated plants.**] Mitteil. Deutsch. Landw. Ges. 36: 481–485, 496–498. 1921.—This is a presentation of the different views of the authors on this subject. All agree that an increase in the CO_2 content of the atmosphere results in increased plant growth. Bornemann, however, contends that stable and green manure turned under in spring rather than in fall results in larger yields because of the increased CO_2 content. Lemmermann cites several experiments to show that the best time to turn under stable and green manure varies with the character of soil, spring plowing giving best yields on light soils, while on heavy soils greater yields may be expected from fall plowing. This he attributes in part to the more speedy nitrification on light soils and the

subsequent loss of the nitrates. Lemmermann also points out that where artificial fertilizers were used no additional effect was shown by the use of stable manure, as would be expected if CO_2 influenced the yield. He insists that Bornemann's contention that stable and green manures increase the CO_2 content and that this factor is to be credited with the increased yields has not been proved by any accurate experiments. Riedel, an engineer, describes the pronounced effect of CO_2 fertilizing in greenhouses, and discusses the possibility of using waste gases as cheap sources of CO_2. [See also Bot. Absts. 7, Entries 626, 1304; 8, Entries 12, 32; 9, Entry 540.]—*A. J. Pieters.*

1460. BOVET, PEDRO A. **Apuntes sobre Phalaris bulbosa o mata de gramilla dulce. [Notes on Phalaris bulbosa.]** Bol. Agric. Provincia Buenos Aires 1[7]: 3–14. *9 fig.* 1920.—Experiments were conducted to test the availability of *Phalaris bulbosa* as a forage crop in the dry and unirrigated sections of the province of Buenos Aires, where the rainfall is less than 310 mm. per annum. Seedings failed to live through the dry period, but cuttings were more successful.—*John A. Stevenson.*

1461. BOVET, PEDRO A. **Ensajo de cultivo de kafir, feterita y milo (1917–18). [Experiments in 1917–18 with kafir, feterita, and milo.]** Bol. Agric. Provincia Buenos Aires 1[8]: 9–14. *2 fig.* 1920.—Experiments have been conducted with kafir, feterita, and milo to test their adaptability to the dry conditions prevailing in the province of Buenos Aires.—*John A. Stevenson.*

1462. BRUNO, ALBERT. **La toxicité du borax pour les végétaux. Note critique. [The toxicity of borax for plants. Critical note.]** Ann. Sci. Agron. Française et Etrangère 37: 185–190. 1920.—The author briefly reviews American literature bearing on the subject, calling attention especially to the work of Conner [see Bot. Absts. 6, Entry 1381], Schreiner and Skinner [see Bot. Absts. 6, Entry 1431], and their co-workers. He states that their results are contrary to those obtained in various researches in France as shown in the work of Bertrand and Rivière and Bailhache. Admitting that the method of incorporation of the fertilizer in the soil is a factor affecting its toxicity, the author suggests that the Americans made an initial mistake in experimenting only with the Searles Lake salts, which he thinks may contain some substance more toxic than borax. In conclusion these investigations with borax-containing fertilizers are cited as new proof of the great difficulties confronting investigators of plant physiological problems.—*A. B. Beaumont.*

1463. CALVINO, EVA MAMELI DE. **Estudios anatomicas y fisiologicos sobre la caña de azucar en Cuba. [Anatomical and physiological studies of sugar cane in Cuba.]** Estac. Exp. Agron. [Cuba] Bol. 46. *49 p., 21 fig.* 1921.—The author gives briefly the history of the production of new varieties of sugar cane from true seed, including the work done to date by the experiment station. The methods originated in Java, India, and elsewhere for obtaining fertile seed are discussed. Varieties Uba, Cristalina, and C291 are described, and histological details by which the 3 may be distinguished are given. Humidity, soil moisture, and other factors which may influence the time of flowering are discussed. The presence of starch grains in the pollen indicates normal condition. Several crosses were made and seedlings grown from the resulting seed.—*John A. Stevenson.*

1464. CALVINO, MARIO. **Informe de los años 1918–1919 y 1919–1920 de la estación experimental agronomica. [Report of the agricultural experiment station for 1918–1919 and 1919–1920.]** Informe An. Estac. Exp. Agron. [Cuba] 1918–1920: 1–786. *329 fig.* 1920.—The work reported includes varietal and cultural tests with the following plants: potatoes, maize (native and Mexican varieties), rice, wheat, buckwheat, milo, *Eleusine coracana*, many varieties of soy beans, *Dolichos lablab*, *Canavali* spp., velvet beans, cow peas, pigeon peas. *Pennisetum purpureum*, *Meibomia leiocarpa*, *Tripsacum latifolium*, *Paspalum dilatatum*, *Ixophorus unisetus*, *Solanum verbascifolium*, Peruvian alfalfa, cotton, tobacco, and sugar cane. Studies were made of the oil-producing capacities of peanut, castor bean, and *Salvia hispanica*, and the fiber-producing qualities of *Meibomia leiocarpa*, *Spartium junceum*, and *Hibiscus sabdariffa* var. *altissima*.—*John A. Stevenson.*

1465. Correa Mendes, F. C. **Relatorio de alguns serviços mais importantes a cargo da Direcção dos Serviços Agricolas, e Florestais, 1919–20.** [Report of the Director of the agricultural and forestry service.] Bol. Agric. [Nova Goa] 2: 28–61. 1920.—The author outlines the activities of the agricultural and forestry service, the most important feature of which is an extensive plan for encouraging the cotton industry.—*John A. Stevenson.*

1466. Cross, W. E. **Distancia a que debe plantarse la caña de azucar.** [Planting distance for sugar cane.] Rev. Indust. y Agric. Tucuman 10: 87–100. 1919.—As a result of 3 and 4 year tests with a number of varieties of sugar cane the author concludes that to secure most economically the greatest quantity of sugar per hectare the distance between rows ought to be the minimum distance which permits of convenient cultivation with modern cultivation machines. This distance is 1.5–1.8 m.—*John A. Stevenson.*

1467. Cross, W. E. **El deterioro de las cañas cortadas.** [Deterioration of cut cane.] Rev. Indust. y Agric. Tucuman 10: 54–55. 1919.—The necessity of milling the Javan varieties of cane as soon as possible after cutting is emphasized. A delay of 3–5 days is permissible in cool weather, but the time should be shortened beginning with September.—*John A. Stevenson.*

1468. Cross, W. E. **El problema de la caña no molida.** [The problem of unmilled cane.] Rev. Indust. y Agric. Tucuman 10: 42–45. 1919.—Wet weather and other conditions often make it impossible to mill all available cane in a given season. Experiments were conducted to ascertain the effect of leaving cane in the field for 2 seasons. During the seasons 1911–13 and 1916–18 the varieties Kavangire, POJ313, 234, 36, and 228 did not suffer any loss in sucrose or purity, and continued to grow during the 2nd season. The ratooning power of the stools was not injured.—*John A. Stevenson.*

1469. Cross, W. E. **El tratamiento de la caña dañada por las heladas.** [Treatment of cane injured by freezing.] Rev. Indust. y Agric. Tucuman 10: 143–153. 1920.—Temperatures of −2 to −26°C. in July, 1919, injured cane in Tucuman. Varieties Rose Bamboo and B208 showed practically no resistance, Java 228 and 108 were somewhat more resistant, and Java 36, 213, and 234 were very notably resistant. Decomposition of several types (*Leuconostoc* and other organisms) may follow freezing. Under Tucuman conditions it is best to leave frozen cane in the fields until cut, but cutting as soon as possible. In the mill great care must be exercised in handling the juice. Cleanliness is essential to prevent further fermentation. Cane too badly fermented for grinding can be used for alcohol or for fuel.—*John A. Stevenson.*

1470. Cross, W. E. **Informe anual del año 1918.** [Report for 1918.] Rev. Indust. y Agric. Tucuman 10: 1–30. *6 fig.* 1919.—Various crops were tested as to availability for replacing cane, in which over production is threatened. Both native and Javan cane seedlings were studied. Other sugar cane work included irrigation experiments, fertilizer tests, planting methods, distance of planting, and the effect of freezing. A number of cane varieties are described. Tests were made with spineless cactus, the Dahomey variety of sweet potato, and with cotton. Varietal tests with tomatoes and citrus were also carried out.—*John A. Stevenson.*

1471. Cross, W. E. **Informe anual del año 1919.** [Annual report for 1919.] Rev. Indust. y Agric. Tucuman 11: 1–24, 29–44. *19 fig.* 1920.—The activities and projects of the Tucuman agricultural experiment station include experiments with sugar cane, sugar beets, cotton, and a wide range of forage crops.—*John A. Stevenson.*

1472. Cross, W. E. **La necesidad de la rotación de cultivos para la caña de Java.** [Necessity for crop rotations with the Javan cane varieties.] Rev. Indust. y Agric. Tucuman 10: 115–124. *2 fig.* 1920.—The replacing of native (criollo) varieties of sugar cane with Javan seedlings necessitates changes in field practice of which crop rotation is the most important. The rotation recommended for Tucuman is 4 years in cane and 1 year in cowpeas, either alone or interplanted with maize; the cowpeas are plowed under. The plan recommended reduces the acreage in cane but gives a higher total yield.—*John A. Stevenson.*

1473. CROSS, W. E. **Recientes resultados con algunos variedades de caña.** [Recent results with cane varieties.] Rev. Indust. y Agric. Tucuman 10: 74–79. 1919.—A report of 4 years' tests of the varieties S.N.179, S.N.211, L.60, and Collyn's seedling is given. All gave low yields as compared with the Javan seedlings and are not frost resistant, consequently are considered unsatisfactory for Tucuman. After 5 years' tests variety POJ105 is pronounced inferior to POJ36 and 213 in yield and frost and disease resistance. After 3 years' tests D1135 was found less frost resistant than the Javan varieties. Its contained sugar, however, does not invert so rapidly.—*John A. Stevenson.*

1474. DOBLAS, JOSÉ HERRERA. **Estudio sobre el maiz.** [Maize studies.] Bol. Asoc. Agric. España 12: 94–98. 1920.—This preliminary study of varieties of corn (maize) lists varieties by size of stalk and height of plant. Certain common varieties are compared as to size of grain, weight of ear, and other characters.—*John A. Stevenson.*

1475. ESPINOSA, LUIS. **El mejoramiento de la caña de azucar en Rio Verde, San Luis Potosi.** [Improving sugar cane.] Rev. Agric. [Mexico] 5: 810–816. *9 fig.* 1921.—Brief descriptions and cultural directions are given of certain cane varieties, including Red Assam, Hambleden seedling, Hawaii 16 and 27, Lahaina, Morada, and Ribbon.—*John A. Stevenson.*

1476. FAWCETT, G. L. **La obtención de cañas de semilla producida en la Argentina.** [Production of sugar cane seedlings from Argentina seed.] Rev. Indust. y Agric. Tucuman 10: 31–41. *12 fig.* 1919.—Until 1919 attempts by experiment station workers to obtain fertile seed for seedling production in Tucuman failed. This is thought to be due to weather conditions. The flowering panicles of the native cane variety (criolla), Kavangire, and certain of the Javan varieties are described.—*John A. Stevenson.*

1477. FAWCETT, G. L. **Notas adicionales sobre las cañas criollas.** [Further notes on native canes.] Rev. Indust. y Agric. Tucuman 10: 169–175. *3 fig.* 1920.—Notes on the origin and distinguishing characters of native cane varieties in Tucuman are given. Pubescence, particularly of the buds, is considered. The prevalence of mutations in the varieties Rayada (striped), Morada (dark red), and Blanca (white), in comparison with the same or similar varieties in Java and elsewhere, is discussed. The author holds that the dark red cane has given rise to the striped and the striped to the white, but that the reverse has not occurred. Dr. Jeswiet of Java disagrees in part with this conclusion.—*John A. Stevenson.*

1478. FERREIRA, EMILIO I. **El algodonero.** [The cotton plant.] Bol. Ministerio Agric. Nación [Argentina] 25: 388–403. 1921.—This is a discussion of cotton culture and the varieties adapted to Argentina, seed selection, planting, cultivation, harvesting, and ginning.—*John A. Stevenson.*

1479. GASSER, G. W. **Report of the work at Rampert station.** Rept. Alaska Agric. Exp. Sta. 1918: 33–54. *Pl. 3–4.* 1920.—Among important facts recorded are: *Medicago falcata* is the only alfalfa perfectly hardy; *Vicia cracca* scored its first failure, after doing well in previous years; *Trifolium lupinaster* suffered winter injury for the first time since seeded in 1914; field peas were a failure on very dry ground, as only 1.6 inches of rain fell during May, June, and July,—lower-lying ground produced some peas; winter wheat and 1 variety of rye were failures, but 2 varieties of rye wintered almost perfectly. In the grain-breeding work all plats, except for a few increase plats of barley, oats, and wheat, were head to row, with 2 drill-row plats; earliest barley and oats ripened in 79 days from date of seeding, earliest wheat in 84 days. Hemp made a short spindling growth; flax ripened 10 per cent of seed when cut Sept. 7; some seed of Jersey Wakefield cabbage was produced, but carrot seed failed to ripen; potatoes grown in pens or cribs produced only ½ as much as in the garden, where 2–2.8 pounds per hill were produced; peas, celery, beans, cabbage, cauliflower, brussels sprouts, kohl-rabi, chard, beets, sugar beets, and carrots were grown successfully in the garden, while cucumbers, muskmelons, egg plant, and peppers were grown in hotbeds; tomatoes were grown in the greenhouse, and a few ripened outside; strawberries winter-killed to some extent; flowers and house plants were successfully grown.—*J. P. Anderson.*

1480. Gasser, G. W. **Report of work at Rampert station.** Rept. Alaska Agric. Exp. Sta. 1919: 30–44. *Pl. 3–6.* 1920.—The author reports on trials and breeding of wheat, barley, oats, and rye. *Medicago falcata*, *Vicia cracca*, field peas, and various garden vegetables and potatoes were also grown. Most greenhouse plants fail to survive the winter as the sun disappears entirely from late November to late January.—*J. P. Anderson.*

1481. Girola, Carlos D. **El cultivo del ricino en Argentina.** [Cultivation of the castor bean.] Bol. Ministerio Agric. Nación [Argentina] 25: 469–498. *2 fig.* 1920.—The culture of castor bean is well adapted to certain portions of Argentina lying between the 32nd and 40th parallels. The species or type known as *Ricinus sanguineus* is recommended for this region. Higher yields are obtained from annual plantings than where the plant is treated as a perennial. Cultural directions from planting to harvesting are given, and methods of oil extraction are considered.—*John A. Stevenson.*

1482. Girola, Carlos D. **Planta invasora-perjudicial y toxica.** [An injurious and poisonous plant immigrant.] Bol. Ministerio Agric. Nación [Argentina] 25: *1 colored pl. (facing p. 468).* 1920.—This author describes *Datura stramonium*, the damage it causes, and methods of control.—*John A. Stevenson.*

1483. Girola, Carlos D. **Planta invasora-perjudicial.** [An injurious plant immigrant.] Bol. Ministerio Agric. Nación [Argentina] 25: *1 colored pl. (facing p. 380).* 1921.—The author describes *Cirsium lanceolatum*, damage caused by it, and methods of control.—*John A. Stevenson.*

1484. Girola, Carlos D. **Sobre una leguminosa forrajera indígena.** [A native leguminous forage plant.] Bol. Ministerio Agric. Nación. [Argentina] 25: 375–387. *1 fig.* 1920.—*Meibomia leiocarpa*, said to be indigenous in Argentina and Brazil, has proved satisfactory as a forage crop in tropical and subtropical Argentina. It is valuable as green feed and for silage. The plant is described and cultural directions are given. The feed value of the plant is shown by analyses made in Argentina, Brazil, and Cuba.—*John A. Stevenson.*

1485. Girón, Enrique Giménez. **Estudio sobre germinación de semilla duras.** [Germination of hard seeds.] Bol. Agric. Téc. y Econ. [España] 13: 596–608. *3 fig.* 1921.—The author discusses mechanical and chemical means of increasing the germination percentage of hard-coated seeds.—*John A. Stevenson.*

1486. Granel Joaquin. **La avena.** [Oats.] Bol. Soc. Rural Cordoba [Argentina] 20: 5271–5282. 1920.—This history of the cultivation of oats in Argentina includes cultural directions as to soils, fertilizers, seeding, varieties, rotations, and harvesting.—*John A. Stevenson.*

1487. Hall, Thos. D. **Moisture in maize.** Jour. Dept. Agric. Union of South Africa 3: 80–81. 1921.—Maize harvested and stored in this climate is not ready to ship to the coast before the end of July or beginning of August. A table is given showing the percentage of moisture in stored maize at different dates.—*E. M. Doidge.*

1488. Hartwell, Burt L. **Thirty-second annual report of the director of the Rhode Island Agricultural Experiment Station.** Bull. Rhode Island State Coll. 15: 69–84. 1920.—The report gives brief statements of the results of the experiments of 1919, grouped in part under the following headings: Organic matter for the soil; efficiency of fertilizers and other manures; plant differences and needs; effect of crops on each other; changing sour soils; plant propagation; inheritance studies with poultry and rabbits; studies of immunity and infection. —*B. L. Hartwell.*

1489. Kuhnert. **Der Sonderausschuss für Flachsbau der D. L. G. und seine Tätigkeit.** [The commission for flax culture of the Deutsche Landwirtschaftliche Gesellschaft and its work.] Mitteil. Deutsch. Landw. Ges. 36: 417–420. 1921.—The author briefly reviews the

origin of the commission and reports on fertilizer tests. Stable manure was injurious, potash and phosphoric acid increased both quantity and quality of output, and nitrogenous fertilizers were helpful if used sparingly and with extreme care. Microscopical studies of the length, diameter, and tensile strength of fibers were also made.—*A. J. Pieters.*

1490. MELLE, H. A. **Spineless cactus as a fodder for stock.** Jour. Dept. Agric. Union of South Africa 3: 68-79. *5 fig.* 1921.—Spineless cactus is easily and cheaply grown and is an excellent means of preventing soil erosion. It is a natural silage and may be harvested at any season of the year. Although not a balanced ration it can be fed in large quantities with other foods, especially during the winter months.—*E. M. Doidge.*

1491. NAVARRO, BERNABÉ G. **La industria de los textiles vegetales en las territorios nacionales del norte del pais. [The textile industry in the northern territories of Argentina.]** Bol. Ministerio Agric. Nación [Argentina] 25: 499-522. 1921.—The author discusses the textile needs of the country and the prospects of obtaining home-grown supplies. Details of the long staple cotton growing industry in the U. S. A. and of the sisal industry of Yucatan are given, and certain indigenous fiber-yielding plants are described.—*John A. Stevenson.*

1492. NOLL, C. F., AND R. D. LEWIS. **Soy beans.** Pennsylvania Agric. Exp. Sta. Bull. 167. *20 p., 1 fig.* 1921.—Soy bean varieties leading in yield of seed in these tests were Ebony, Elton, Manchuria, Merko, Mongol, and Ohio 10,015. Those leading in yield of hay are Ohio 7,496, Ohio 10,015, Elton, Ohio 9,035, Ohio 9,016, and Merko. In an 8-year comparison of soy beans and oats, each in a 4 year rotation, soy beans produced much more protein per acre. When cut for hay soy beans also produced slightly more net energy. Wheat gave somewhat lower yields after soy beans than after oats, because of late seeding after soy beans. Soy beans when grown with corn for silage failed to show an increase in total yield over corn grown alone. If soy beans comprise 10 per cent or more of the crop when grown with corn, an appreciable increase in per cent of protein is noted in the silage.—*C. R. Orton.*

1493. PARISH, E. **Chicory as a farm crop.** Jour. Dept. Agric. Union of South Africa 3: 12-130. 1921.—This is a general account of cultural methods for chicory and is supplemented by notes by K. MELDAL JOHNSEN, on the cultivation of the crop in the Alexandria District of the Cape Province.—*E. M. Doidge.*

1494. PRATT, H. E. **Report of work at the Kodiak live stock and breeding station.** Rept. Alaska Agric. Exp. Sta. 1918: 84-90. *Pl. 10.* 1920.—Oats and field peas were grown for hay. Ten acres of Banner oats were grown; also 3 varieties of barley. Red clover and alfalfa were winter killed. A variety of vetch made poor growth compared with field peas. Attempts to introduce tussock-grass (*Poa flabellata*) from the Falkland Islands were not successful. Twelve varieties of potatoes were tested. Silage is made chiefly from beach rye (*Elymus mollis*) and beach sedge (*Carex cryptocarpa*). Sunflowers grown for silage were not profitable. Native bluetop (*Calamagrostis langsdorfii*) is the principal grass used for hay.—*J. P. Anderson.*

1495. PUIG, JUAN. **El cultivo del Phalaris bulbosa en el Uruguay. [Cultivation of Phalaris bulbosa in Uruguay.]** Inspección Nacion. Ganaderia y Agric. [Uruguay] Bol. 40. *32 p., 6 fig.* 1921.—Either seed or cuttings may be used to establish *Phalaris bulbosa*, which has proved an excellent forage crop. It is very resistant to cold, grows on practically all soils, and yields as a rule 4 cuttings each season. The author outlines cultural directions, and tabulates yields obtained in experimental work.—*John A. Stevenson.*

1496. PUIG, JUAN. **El sorgo azucarado. [Sweet sorghum.]** Inspección Nacion. Ganaderia y Agric. [Uruguay] Bol. 39. *42 p., 19 fig.* 1920.—Sorghum has proved very satisfactory as a forage crop under the dry conditions prevailing in many parts of Uruguay. Cultural directions are given, including methods of harvesting, and preparation of silage. Variety tests were conducted with milo, amber sorghum, pink Kaffir, Sudan grass, and other sorghum varieties, the variety commonly grown being Early Minnesota; yields obtained are tabulated. A method of making chemical tests for presence of hydrocyanic acid in the forage from the

varieties is described; a color chart illustrating these tests is included. The feeding value of the sorghums in relation to alfalfa and other forage crops is discussed, and the chemical analyses of the grain and hay obtained from the various varieties are given.—*John A. Stevenson*

1497. QUIN, HERBERT G. **The peanut (Arachis hypogea).** Jour. Dept. Agric. Union of South Africa 3: 160–164. *3 fig.* 1921.—This is a general account of the peanut plant and methods to be used in its cultivation.—*E. M. Doidge.*

1498. RADER, F. E. **Report of work at Matanuska station.** Rept. Alaska Agric. Exp. Sta. **1918**: 71–84. *pl. 7–9.* 1920.—The grains for seeding were grown at the Fairbanks station in 1917. Three varieties of wheat, 2 of oats, and 2 of barley were tried. Spelt grew well but lodged badly and did not ripen; buckwheat was successful. Oats were grown for hay. Several varieties of winter rye made good growth. Canada field peas sown May 18 had ripened half the pods by Oct. 1. Corn was not a success. Sugar beets were small, containing 14.6–16.9 per cent sugar. Mangel-wurzel, beets, and carrots grown for stock feed gave disappointing results; rutabagas and turnips, however, did well. Forty varieties of potatoes and 10 of the best early seedlings from the Sitka station were tried. Potatoes are the chief money crop of the region. Cauliflower does well. A nursery is being started.—*J. P. Anderson.*

1499. RENSON, CARLOS. **El barajillo, leguminosa forrajera de America Central.** [**A leguminous forage plant for Central America.**] Rev. Agric. Tropic. [Salvador] 1: 65–93. *8 pl.* 1921.—*Meibomia rensoni* Paynter in ed. (locally known as barajillo), a native shrub of Salvador growing at altitudes 600–1200 m. above sea level, gives promise as a forage plant. Difficulties were experienced in obtaining a stand, because sections of the pods were used for planting rather than the cleaned seed. Directions for obtaining cleaned seed and for seeding are given. —*John A. Stevenson.*

1500. RENSON, CARLOS. **El zacate jaraguá.** [**Jaragua grass.**] Rev. Agric. Trop. [Salvador] 1: 2–9. *4 pl.* 1921.—*Cymbopogon rufus* is a forage grass of Brazilian origin which has given excellent results. Directions for obtaining a stand by various methods of seeding are given.—*John A. Stevenson.*

1501. RICHTHOFEN, VON. **Rauhweizen (Rivett's sheriff bearded).** [**Bearded wheat (Rivett's sheriff bearded).**] Mitteil. Deutsch. Landw. Ges. 36: 541. 1921.—Though bearded wheat is seldom grown at present, Rivett's Sheriff Bearded is distinctly advantageous for seeding after oats, as it produces better yields and matures 10 days later than other varieties. The author believes that seeding after clover is a mistake.—*A. J. Pieters.*

1502. RINDL, M. **Castor beans and castor oil.** South African Jour. Indust. 4: 540–547. 1921.—Although climatic and other conditions in Natal and Portuguese East Africa are suited for growing the castor oil plant, the only prospect of commercial success lies in the possibility of the world's demand for lubricants exceeding the supply of mineral-oil lubricants. —*E. M. Doidge.*

1503. RINDL, M. **Some sources of semi-drying oils.** South African Jour. Indust. 4: 479–485. 1921.—The possibilities of a number of plants as oil-producers, are considered. Corn oil and cotton seed oil as produced in South Africa are discussed. Manketti nuts (*Ricinodendron rautanenii* Sching) yield a semi-drying oil insoluble in alcohol and readily soluble in light petroleum. But as long as other oil seeds are obtainable at reasonable rates, intractable nuts of this kind with low oil content are likely to remain unused; this is true also of Ingogo nuts. Seeds of *Jatropha curcas*, cultivated in the Portuguese colonies, are exported to Portugal in considerable quantities for making Curcas oil, a strong purgative.—*E. M. Doidge.*

1504. RODRÍGUEZ, SOCRATES. **Nociones sobre ensilaje de plantas. La parva-silo.** [**Notes on silage making. The stack silo.**] Inspección Nacion. Ganaderia y Agric. [Uruguay] Bol. 35. *22 p., 10 fig.* 1919.—Methods of making stack silos and the importance of silage in Argentina

and Uruguay are discussed. Directions are given for planting and harvesting, and making silage, of sorghum and corn.—*John A. Stevenson.*

1505. RUBY, M. J. **Essais de sorgho et mais à sucre en vue de la production de l'alcool industriel. [Experiments with sorghum and sweet corn for production of industrial alcohol.]** Ann. Sci. Agron. Française et Etrangère 37: 155–161. 1920.—Maize and sorghum were successfully grown for sugar in the fertile and irrigable lands of the plain of Roussillon (Eastern Pyrenees). On the basis of field experiments with 4 varieties of sorghum and 5 of maize, sorghum is considered preferable because it makes greater vegetative growth, is richer in sugar, and is not injured by the European corn borer (*Pyrausta nubilalis*), which considerably reduced the yield of maize.—*A. B. Beaumont.*

1506. SCASSO, JOSÉ M. **Instrucciones practicas para preparar la parva-silo o silo al aire libre y el silo comun en tierra. [Instructions for making pit and stack silos.]** Bol. Ministerio Agric. Nacion [Argentina] 26: 60–87. *19 fig.* 1921.—The author gives directions for making various types of pit and stack silos adapted to conditions in Argentina.—*John A. Stevenson.*

1507. SCHUBERT. **Die Feststellung der Ertragssteigerung auf Dauerweiden. [Determining increased yields on permanent pastures.]** Mitteil. Deutsch. Landw. Ges. 36: 338–339. 1921.—The author points out the difficulties in determining returns from treating pastures and proposes using 1 herd only, shifting it from one field to another. Two experiments on fertilizing pastures showed that applying nitrogen caused increased live weight and milk yields which far exceeded the cost of the fertilizer.—*A. J. Pieters.*

1508. SCHULTZ, E. F. **El problema de los pastos en Tucuman. [The problem of forage crops for Tucuman.]** Rev. Indust. y Agric. Tucuman 10: 59–74. *9 fig.* 1919.—The Tucuman experiment station has tested many plants to secure forage crops resistant to the adverse weather conditions, as scarcity of pasturage and forage during the dry seasons causes heavy losses to cattle raisers. Peruvian alfalfa is much superior to the native type, giving 5 cuttings as against about 3 for the latter. It is very resistant to cold, but is injured by excessive rain. *Phalaris bulbosa* resists cold but is difficult to establish by seeding. Increase by division of old plants has proved more satisfactory. *Paspalum dilatatum* was abandoned because of the presence of a fungus (*Claviceps*) in the spikelets which is reported as killing the stock. Rhodes grass is considered the best of all forage crops that can be grown without irrigation. Sudan grass is very resistant to drouth, a rapid grower and high yielder. Natal grass was not satisfactory. Cow peas can be used in rotations with other crops and are well adapted to all parts of the country. Sweet sorghums, rape, timothy, *Dactylis glomerata*, *Lolium* spp., *Festuca* sp., and *Poa pratensis* are suited to certain parts of the province.—*John A. Stevenson.*

1509. SCHULTZ, E. F. **La batata forrajera "Dahomey." [The Dahomey sweet potato as a forage crop.]** Rev. Indust. y Agric. Tucuman 10: 100–108. *5 fig.* 1919.—Until the variety Dahomey, secured from U. S. A. Department of Agriculture, was grown in Tucuman, sweet potatoes had been grown mainly for human food. The Dahomey is recommended for animal feeding because of its large yields, and is in addition superior to the native variety for human consumption. The presence of *Rhizoctonia violacea* constitutes a drawback to its culture. Cultural directions are given.—*John A. Stevenson.*

1510. SCHULTZ, E. F. **Notas adicionales sobre la grama Rhodes. [Additional notes on Rhodes grass.]** Rev. Indust. y Agric. Tucuman 11: 45–54. *7 fig.* 1920.—Rhodes grass has survived temperatures of from −7 to −10°C. and is also very resistant to heat and drouth. The 1st cutting, obtained 49 days after seeding, averaged 25,000 kgr. of green feed per hectare, the 2nd 13,000. Stock pastured on the grass gained weight satisfactorily and without injuring the stand. The grass is easily eradicated. Seeding should be done preferably in October or November.—*John A. Stevenson.*

1511. SCHULZ, A. **Getreidestudien I. Abstammung und Heimat des Roggens. [Place of origin and descent of cultivated rye.]** Ber. Deutsch. Bot. Ges. 37: 528–530. 1919.—The

author concludes from his examination of the evidence that cultivated rye (*Secale cereale* L.) originated from *Secale anatolicum* Boissier and came into cultivation in Turkestan.—*R. M. Holman.*

1512. Semichon, L. **Analyses des sorghos et maïs sucrés cultivés à Palau-del-Vidre (Pyrénées-orientales). [Analyses of sorghums and sweet corns cultivated in Palau-del-Vidre (Eastern Pyrenees).]** Ann. Sci. Agron. Française et Étrangère 37: 173–184. 1920.—Analyses of the 5 varieties of sorghum and 4 varieties of maize grown experimentally [see Bot. Absts 10, Entry 1505] are reported. The sorghum yielded per hectare as much as 6200 kgr. sugar, corresponding to 3750 l. of alcohol, a good quality being obtained without rectification. The pressed pulp may be used as cattle food, and also has possibilities for paper making. Sweet corns are less promising than sorghums because of smaller yield, smaller sugar content, and more difficult preservation, both in the field and after harvest.—*A. B. Beaumont.*

1513. Sherwin, M. E. **Effect of fertilizers on germination and seedling growth of corn and cotton.** Jour. Elisha Mitchell Sci. Soc. 36: 16. 1920.—Heavy applications of soluble mineral fertilizers cause greater delay in germination. Organic fertilizers cause greater injury to the seedlings. Very small amounts of borax cause almost complete chlorosis of corn seedlings.—*W. C. Coker.*

1514. Silveira, Ricardo Salgueiro. **Plantas oleaginosas. [Oil plants.]** Inspección Nacion. Ganaderia y Agric. [Uruguay] Bol. 37. *21 p.* 1920.—The following oil producing plants can be successfully grown in Uruguay: peanut, sunflower, cotton, rape, soy bean, castor bean, and *Sesamum orientale.* Brief cultural directions are given for each, including recommended varieties, seeding, cultivation, and harvesting.—*John A. Stevenson.*

1515. Snodgrass, M. D. **Report of the work at Fairbanks station.** Rept. Alaska Agric. Exp. Sta. 1918: 54–71. *Pl. 5–6.* 1920.—Rye winter killed badly. Spring grains were seeded May 26–30, the late spring following an unusually cold winter. Grain following grain matured earlier but produced less than grain following other cultivated crops; the yield was better following clover but endangered by lodging or early frosts. Comparisons of grain selections are given for breeding plats as well as for increase plats. Of new varieties, 1 of barley and 4 of wheat were received from the U. S. A. and Canada, and 4 of barley from Rampert. Some work was done in alfalfa selection. Twenty-three varieties of potatoes were tested. Potatoes on south slopes were better than those on north slopes; potatoes with the tops cut off when frosted August 26 yielded less than when the tops were left on until digging time. Turnips, carrots, and sugar beets comprised the root crops grown. Strawberries were a failure owing to winter injury. Red raspberries are being tried.—*J. P. Anderson.*

1516. Snodgrass, M. D. **Report of work at Fairbanks Station.** Rept. Alaska Agric. Exp. Sta. 1919: 44–55. *Pl. 7–13.* 1920.—Yields of wheat and Canadian oats are reported and a table on variety tests of barley and oats is given. Potatoes, sugar beets, carrots, turnips field peas, sunflowers, and red clover were grown. Hansen's Semipalatinsk alfalfa has withstood 4 winters, but other kinds have not proved so hardy.—*J. P. Anderson.*

1517. Stent, Sydney M., and H. A. Melle. **Fodder and pasture grasses of South Africa. II. Rhodes grass (Chloris gayana Kuth).** Jour. Dept. Agric. Union of South Africa 3: 136–141. *2 fig.* 1921.—Rhodes grass, a native of South Africa, was first brought into cultivation by Cecil Rhodes. It is a perennial, mainly a summer grass, requiring a summer rainfall, and will not withstand protracted drought or very severe cold. It is an excellent pasture and hay grass and palatable to all kinds of stock, thus comparing favorably with Teff and Kikuyu.—*E. M. Doidge.*

1518. Taylor, H. W. **The culture of Virginian tobacco.** South African Jour. Indust. 4: 650–662. *Pl. 1–5.* 1921.—In Rhodesia the rainfall is ample for the cultivation of Virginia tobacco and this is generally true in the Magaliesberg, Kat River, and Oudtshoorn areas. Several types of soils are considered suitable; black turf gives good results but is inclined to

be alkaline; sandy loams may be used, if judiciously fertilized. The preparation of soil and methods of cultivation of Virginia tobacco are discussed in detail.—*E. M. Doidge.*

1519. TAYLOR, H. W. **The tobacco industry.** South African Jour. Indust. 4: 467–472, 563–574. *Pl. 1–3.* 1921.—The total amount of commercial tobacco produced in Africa is probably not above 70,000,000 pounds, of which the Union of South Africa produced 14,931,000 in 1918. Tobacco is grown in the Transvaal chiefly in the Magaliesberg area, in the Piet Retief and Potchefstroom districts, and in the western part of the Cape Province. The qualities of the various types, mainly Turkish, cigar, and Virginia, grown in different districts are discussed, and directions given for selection of seed and proper preparation of seed beds.—*E. M. Doidge.*

1520. TICE, C. **The potato industry in British Columbia.** Potato Mag. 4[4]: 8, 20–21 *1 fig.* 1921.—Favorable climate and soil and freedom from certain pests and diseases make potatoes yield well in British Columbia. Improvement is expected from seed certification, rules of which are given.—*Donald Folsom.*

1521. TONNELIER, A. C. **Informe sobre diversos métodos del cultivo del maiz. [Methods of maize cultivation.]** Bol. Ministerio Agric. Nación [Argentina] 25: 47–54. *1 fig.* 1920. This reports experiments to ascertain the best methods of cultivating maize, carried out over a period of 8 years, 1909–1917. No difference in yields was noted between plots hilled and those not hilled. Opening ditches or furrows between rows and gradually filling them gave increased yields, while the system of ditches kept open between rows proved most satisfactory of all.—*John A. Stevenson.*

1522. TORRES, L. G. **Una leguminosa forrajera indigena. [An indigenous leguminous forage plant.]** Rev. Agric. [Mexico] 6: 84–86. *2 fig.* 1921.—*Meibomia leiocarpa*, a native of Brazil and parts of Mexico, has given promise as a forage plant in Cuba and is recommended for trial in Mexico. Brief cultural directions are given.—*John A. Stevenson.*

1523. VASQUEZ, DAVID. **El trigo. [Wheat.]** Rev. Soc. Rural Cordoba [Argentina] 20: 5090–5109. 1920.—Seed selection, hybridizing, and seed disinfection of wheat are discussed.—*John A. Stevenson.*

1524. WAGNER, PAUL. **Die Düngung der Wiesen. [The fertilizing of meadows.]** Arbeit. Deutsch. Landw. Ges. 308. *141 p.* 1921.—This report on 15 series of experiments in fertilizing meadows, carried on for periods of from 4–14 years, gives tables showing percentages of phosphoric acid, potash, and nitrogen in hay at 15 per cent moisture content, and total yield of hay. The fertilizers used were forms of potash, phosphoric acid, and nitrogen in varying combinations. Forty questions, covering all phases of the effects of various fertilizers, are asked, and answered by the results of 1 or more series of experiments. In general both phosphoric acid and potash increase yields, but neither alone gives maximum results. The application of one on soil deficient in the other is ineffective. Composition of hay may be taken as an index to the fertilizer needs of the soil. Application of nitrates results in small and unprofitable increases, the total nitrate content of the hay being no more and sometimes less than that of hay produced on plots receiving potassium and phosphorus. This is explained by the fact that nitrates however used encourage the grasses but suppress the legumes.—*A. J. Pieters.*

1525. WEISS, H. B. **Field crop yields in New Jersey from 1870–1919.** Sci. Monthly 13: 342–349. 1921.—Curves from 10-year reports of the last 50 years show a gradual increase in the acreage of field crops in New Jersey. This is attributed to the intelligent use of fertilizers, general efficiency, improved methods of soil management, seed selection, and increased control of insects and plant diseases.—*L. Pace.*

1526. WHITE, W. T. **Report of work at Kodiak station.** Rept. Alaska Agric. Exp. Sta. 1919: 55–65. *Pl. 14.* 1920.—At Kalsin Bay the application of 10 tons of stable manure per

acre increased the yield of hay 11 per cent, and adding 125 pounds of sodium nitrate to the manure increased the yield 15 per cent. Test of sunflowers for silage was not promising. Alfalfa, spurry, Petrowski turnips, buckwheat, and vetch were also tested as forage crops. Potatoes and some vegetables were grown, and gooseberry and currant responded well to cultivation.—*J. P. Anderson.*

BIBLIOGRAPHY, BIOGRAPHY AND HISTORY

NEIL E. STEVENS, *Editor*

(See also in this issue Entries 1511, 1517, 1624, 1631, 1652, 1670, 1783, 1908, 1909, 1920, 2014)

1527. ANONYMOUS. **[Commemoration of the 250th anniversary of the birth of Herman Boerhaave (Dec. 31, 1668–Sept. 23, 1738).]** Janus 23: 193–369. *9 pl., 19 fig.* 1918.—The following papers, chiefly in German and French, make up the memorial: Discourse on the life of Boerhaave, by E. C. VAN LEERSUM (p. 193–206); (2) Boerhaave as oculist, by W. P. C. ZEEMAN (p. 207–214); (3) his influence on the development of medicine in Austria, by MAX NEUBURGER (p. 215–222); (4) his importance for the science of chemistry, by ERNST COHEN (p. 223–290); (5) Boerhaave as professor-promoter, by J. E. KROON (p. 291–315); (6) his clinical teaching as shown in Gerard van Swieten's stenographic records, by E. C. VAN LEERSUM (p. 316–346 and 8 fac-simile plates); (7) Boerhaave as a naturalist, by F. W. T. HUNGER (p. 347–357); (8) engraved portraits of Boerhaave, by J. G. DE LINT (p. 358–365); (9) his portrait by by Arent de Gelder, by W. MARTIN (p. 366–369). The last mentioned serves as frontispiece, while many of the portraits discussed by de Lint, together with those of contemporaries, and illustrations of places and objects of interest, are found in pages 223–290. The articles by Cohen, Hunger, and Neuburger are of special importance for the history of science, and many of the papers are richly documented.—*M. F. Warner.*

1528. ANONYMOUS. **David Ernest Hutchins.** Kew Bull. 1921: 32–33. 1921.—Sir David Ernest Hutchins (1850–1921) was trained at the École Nationale des Eaux et Forêts, Nancy, and entered the forest service of Mysore, but in 1882 was transferred to Cape Colony, where he remained until 1905. He wrote several important reports on the forests of Mt. Kenia, Cyprus, Australia, and New Zealand.—*M. F. Warner.*

1529. ANONYMOUS. **Mulford biological exploration.** Amer. Jour. Pharm. 93: 438–443. 1921.—A brief outline is presented of the plans of the Mulford biological exploration of the Amazon Basin under the direction of H. H. Rusby. [See also Bot. Absts. 8, Entry 2133.]—*Anton Hogstad, Jr.*

1530. ANONYMOUS. **Presentation of medal to F. B. Power.** Amer. Jour. Pharm. 93: 435–438. *Pl. 1–2.* 1921.—An account is given of the presentation of a gold medal by Henry S. Wellcome to Dr. Frederick B. Power, in recognition of his services as Director of the Wellcome Research Laboratories for a period of nearly 20 years prior to 1914.—*Anton Hogstad, Jr.*

1531. ANONYMOUS. **Suspension of "The Botanical Magazine."** Gard. Chron. 69: 133–134. 1921.—Believing that a work so long identified with Kew Gardens ought to become an official publication, the publishers offered to the government the good will and copyright purchased from the Curtis family in 1844, but as the Ministry of Agriculture was unable to take advantage of this offer, the journal is discontinued from Dec. 1920.—*M. F. Warner.*

1532. ANONYMOUS. **The early records of sugar cane. Approximate geographical table.** South African Sugar Jour. 5: 183. 1921.—"It seems definitely established that sugar cane was growing on the Ganges in 327 B. C. and in China in 250 B. C.," but other early dates are vague. It is next positively mentioned in A. D. 627, when the Byzantine emperor Heraklius destroyed Dastagerd, in Persia. A chronological table is given showing the spread of sugar cane to different parts of the world from A. D. 680 to 1852.—*M. F. Warner.*

1533. ANDREWS, A. LEROY. **John Macoun.** Bryologist 24: 39–41. 1921.—John Macoun (1830–1920), born near Belfast, Ireland, came to Ontario in 1850. He taught school, became professor at Albert College, Belleville, and in 1881 Botanist to the Dominion Government. The rest of his life was spent in government service, doing that pioneer work in the botanical exploration of Canada with which his name will always be associated. He was also much interested in zoology, especially ornithology. Macoun's hepatics and sphagna were determined by competent European students; his mosses by Müller and Kindberg, who "developed an irresponsibility as to species from which bryology still suffers."—*E. B. Chamberlain.*

1534. ARBER, AGNES. **The draughtsman of the 'Herbarum Vivae Eicones.'** Jour. Botany 59: 131–132. 1921.—The author presents further evidence to prove that Hans Weiditz was the artist and engraver of the illustrations in the Herbarum Vivae Eicones of Otto Brunfels.—*Adele Lewis Grant.*

1535. ARNELL, H. W. **Nécrologie. [Scandinavian bryologists that have died in recent years.]** Rev. Bryologique 47: 74–75. 1920.—The author reports the deaths of the following Scandinavian botanists and lists their more important bryological publications: Nils Bryhn, who was a physician at Hönefos, Norway, and died in December, 1916, at the age of 62; Ingebrigt Severin Hagen, a physician at Trondhjem, Norway, who died in June, 1917, at the age of 63; Sven Berggren, a professor at the University of Lund, Sweden, who died in June, 1917, at the age of 80; and Baard Kaalaas, a school inspector at Kristiania, Norway, who died in September, 1918, at the age of 67.—*A. W. Evans.*

1536. BLOSSFELD, ROBERT. **Sander ist tot! [Death of Sander.]** Gartenwelt 25: 80. *Portrait.* 1921.—An account is given of the life and work of Heinrich Friedrich Konrad (i.e., Frederick) Sander, born in Bremen in 1847, died in Bruges, Dec. 23, 1920. He founded the firm of Sander & Sons, of St. Albans, England, and Bruges, noted importers and growers of orchids.—*M. F. Warner.*

1537. BONAPARTE, ROLAND. **Usages et folk-lore des fougères. [Customs and lore of ferns.]** La Nature 47^2: 401–403. *Fig. 1–3.* 1919.—Among ancient remedies was the "Scythian lamb" (*Cibotium Barometz*), found in India, Java, Cochinchina, and China, the silky down of which is reported by Père Cadière as still used in northern Annam for dressing cuts, a practice discussed by Loureiro in his Flora Cochinchinensis. The Annamites also use *Adiantum flabellatum* for wounds made by sharp instruments. They eat the young shoots of *Diplazium esculentum* and the rhizomes of *Polypodium coronans; Cleichenia linearis*, which is very tough, furnishes rough partitions in stables, and the dry fronds of *Acrostichum aureum* are used to thatch their houses. *Platycerium coronarium* is regarded by the Annamites with awe or fear; they believe that it harbors a spirit and will not cut down trees on which it grows. —*M. F. Warner.*

1538. BRITTEN, JAMES. **Alexander Irvine.** Jour. Botany 59: 178–179. 1921.—An interleaved copy of Irvine's London Flora (1838), part of the additions to which were later utilized in his Illustrated Handbook of British Plants, furnishes the motive for several interesting items and references to biographical accounts of this botanist. Irvine was editor of The Phytologist in the '50's, and the Botanists' Chronicle (1863–65).—*M. F. Warner.*

1539. [BRITTEN, JAMES.] **Clara Maria Pope.** Jour. Botany 56: 126–127. 1918.—The 3rd wife of Alexander Pope was noted for her paintings of flowers, of which several groups, made about 1820–22, are mentioned.—*Neil E. Stevens.*

1540. BRITTEN, JAMES. **Gentiana pneumonanthe.** Garden 85: 19–20. 1921.—There are no problems of nomenclature connected with this plant, although it has had a long history in botanical literature. Its specific name was first used by Cordus (1561), who called the plant Pneumonanthes. The English "Calathian Violet" used by Gerard, and first given by Lyte in his translation of Dodoens (1578), is merely the translation of Viola Calathiana of Pliny, who may not have meant this plant. Ruellius (1536) definitely applied to it the name

Calathiana. The earliest figure, as well as the first English description, is that of Lyte (1578), and Britten cites many other pre-Linnean illustrations and a number of early records of British localities.—*M. F. Warner.*

1541. BRITTEN, JAMES. **"John Frederick Miller and his Icones."** (**Bibliographical notes, LXXVIII.**) Jour. Botany 57: 353. 1919.—This refers to a note (LIII) published in 1913, describing a fascicle of 7 plates bound with the Icones Animalium et Plantarum of John Frederick Miller, but which are actually by his father, John Miller.—*Neil E. Stevens.*

1542. [BRITTEN, JAMES.] **Robert Allen Rolfe.** Jour. Botany 59: 182–183. 1921.—The botanical work of Rolfe, who died April 13, 1921, is summarized. He had been at Kew since 1879, devoting himself to the Orchidaceae, but "much good work in other orders stands to his credit." The name *Rolfea* was given by Zahlbrückner in his honor to a Guiana orchid which had been named by Rolfe *Jenmania*, in ignorance of the fact that this generic name was preempted.—*M. F. Warner.*

1543. BRITTEN, JAMES. **The Compendium of Smith's 'English Flora.'** (**Bibliographical notes. LXXXIV.**) Jour. Botany 59: 176–178. 1921.—Under this head Britten discusses the several editions of this book, and the crediting of the 1st (1829) to Aeneas MacIntyre, with mention of other work by him.—*M. F. Warner.*

1544. BRITTEN, JAMES. **The true Shamrock and how to identify it.** Garden 85: 139–140. 1921.—Facts and traditions are presented regarding the Shamrock, with quotations from early botanical writings showing that the name was originally applied to both purple and white clovers (*Trifolium pratense* and *T. repens*), and later generally restricted to the white. For a long time, however, it has been applied strictly to *T. minus*, the lesser yellow trefoil.—*M. F. Warner.*

1545. BROCKMANN-JEROSCH, H. **Surampfele und Surchrut. Ein Rest aus der Sammel stelle der Ureinwohner der Schweizeralpen. [Sorrels; a survival of the food resources of the primitive inhabitants of the Swiss Alps.]** Neujahrsbl. Naturf. Ges. Zürich 123: 1–28. 1921.—The knowledge of wild plants still used as food throws light on primitive foodstuffs, and an example is found in Swiss species of *Rumex*, which are indigenous in the Alps, are widely distributed, and in their popular names give evidence of wide and long-continued use. The tender sour forms of the section *Acetosella* are gathered and eaten by children and also sold in the markets. They are sometimes cultivated and crossed with the less acid, large-leaved species of the section *Lapathum*, producing a plant of more luxuriant growth, a process of improvement which has long been practised. *Rumex alpinus*, the "Blacken" or "Blackten," which grows everywhere in Switzerland, has popular names indicating a varied utilization. Its young leaves are eaten like spinach, while its fresh stalks are eaten raw as a tidbit by both children and adults. It is a substitute for the costly Asiatic rhubarb of the pharmacopoea, and its leaves are used externally as cooling applications. But its largest use at the present time is as fodder for pigs, the leaves being gathered in season and either dried or cooked and stored for winter consumption in the form known as "Mass." "Blackten" is rather extensively grown in gardens, often very crudely cultivated, but sometimes well manured and tended. Thus the use of *Rumex alpinus* in Switzerland today corresponds to all stages of human culture, exhibiting: (1) Plants growing wild, unused; (2) plants gathered for use; (3) wild plants tended with reference to competition and perpetuation; (4) actual cultivated plants. Researches in literature and tradition show, moreover, that "Blackten" was a primitive economic plant, and that "Mass" was originally a human food.—*M. F. Warner.*

1546. BUNYARD, E. A. **Cherry culture in Kent.** Garden 85: 256–257. 1921.—The article concerns the culture of cherries, which is said to have been "revived" by Richard Harris, gardener to Henry VIII. The story of Harris is given in The Husbandman's Fruitful Orchard (1609), and the passage quoted, showing that he brought "out of Fraunce great store of graftes, especially Pippins, before which time there were no Pippins in England," also cher-

ries and pears from the Low Countries, does not indicate that cherry culture had languished before that time. Numerous references are given to show that, on the contrary, cherries must have been largely grown in mediaeval times and ever since.—*M. F. Warner*

1547. C., J. **The size of yew trees.** Garden 85: 205–206. 1921.—Mention is made of an article in Glasgow Naturalist, Vol. V., No. 1, by John Renwick, entitled "Yew trees in the Clyde area," which gives measurement of the yew at Loudoun Castle, Ayrshire, taken 1911. At 2 feet from the ground it measured 13 feet, 9½ inches and had a spread of 81 feet. Four centuries may be given as a very probable age for this yew, under whose branches it is said that the articles of union between Scotland and England were signed. Other measurements and statements from Renwick's article are quoted.—*M. F. Warner.*

1548. Durham, H. E. **Some etymological notes.** Jour. Pomol. 2: 115–129. 1921.—Numerous derivations have been suggested for the name Permain or Pearmain, but the use of the word in very old literature in connection with the Warden pear indicates that it was applied to a fruit of great keeping quality, hence it was probably from the old French permaindre or parmaindre (Latin permanere). Of the names Reinette and Queening, the former was probably derived from Reginetta or Little Queen, the latter more likely from coin or quoin (angle), on account of the angular form of the fruit. So, too, Quince may have come from the same source, because of its ribbed fruit, rather than from the Cretan town of Cydon whence it was originally exported. The Calville or Calleville, as the apple itself is of Norman origin, is probably named from the commune of Calleville in the Département de l'Eure. Codling or Quodlin is not from "coddle," to parboil, but more likely from the rattling of its pips like pease in a cod. The old apple, Gennet Moyle, from Gennet a mule or hybrid, and Moyle a scion or graft, meaning therefore a hybrid produced by grafting. The Normans belong to the bitter-sweet group, and were probably named from Normandy, where that class of apples is highly esteemed today, and it was therefore unfortunate to attempt to substitute the name Hereford for Norman. Under Peaches, Pavies, Nectarines, and Brugnons, Hogg's inaccurate use of these terms is noted.—*M. F. Warner.*

1549. Earle, F. S. **S. M. Tracy as a botanist.** Torreya 21: 64–65. 1921.—Tracy's main work was with forage-plants adapted to the southern states [U. S. A.], but as a botanist his interests were chiefly taxonomic. Most of his activity was in field-work and collecting. He specialized in the grasses and their parasitic fungi. Most of his botanical papers deal with the latter group.—*J. C. Nelson.*

1550. Fawcett, William. **William Harris.** Kew Bull. 1921: 31–32. 1921.—An appreciation by a colleague of Harris' work in connection with the government gardens in Jamaica and as collector and student of its flora. Harris died Oct. 11, 1920, in Kansas City, U. S. A.—*M. F. Warner.*

1551. Fink, Bruce. **Lincoln Ware Riddle, lichenist.** Bryologist 24: 33–36. *Portrait.* 1921.—Dr. Riddle (1880–1921) was born in Jamaica Plain, Massachusetts, graduated and received his doctorate from Harvard. His professional career was at Wellesley College, save for a year of study in Europe and a slightly longer period as assistant professor at Harvard. He had from youth been interested in botany, later specializing in lichens, in which group he was an authority. The bibliography includes 24 titles.—*E. B. Chamberlain.*

1552. G[érardin], E. **Quelques considérations sur les camphres de Bornéo et de N'gai. Le camphre, parfum précieux, cosmétique et antipestilentiel au Moyen âge. [Consideration of Borneo and Ngai camphor, and camphor as a perfume, cosmetic and antipestilential in the Middle Ages.]** Parfumerie Moderne 14: 118–119. 1921.—Botanical sources and properties are given of Borneo camphor (*Dryobalanops aromatica*) and Ngai (*Blumea balsamifera*). From Rhazes (923 A.D.) it is inferred that the drug known in remote times was probably from *Dryobalanops* rather than *Laurus* (*Cinnamomum*) *Camphora.* The author gives historical notes on camphor as a perfume and the special receptacles made to contain it. Its use in Persia is recorded in 636, and it was in high esteem among the Arabs, in Egypt, India, and

China. At one time it was considered such an invaluable remedy against the plague that a triumphal column was erected in its honor in Verona.—*M. F. Warner.*

1553. Gérome, Joseph. **Au sujet de la Courge de Siam; valeur économique, origine, nomenclature. [On the "Siamese gourd," its economic value, origin, and nomenclature.]** Jour. Soc. Nation. Hort. France 22: 100–102. 1921.—The "Courge de Siam" was introduced to cultivation in 1824 under the name *Cucurbita melanosperma*, without any intimation of its place of origin. In 1854 it was found that it was extensively grown in China, where it was used as a fodder plant; this and certain other considerations led to the conclusion that it was a native of eastern Asia. In 1883, however, de Candolle threw doubt upon this theory, as all the wild species of *Cucurbita* known are from Mexico or California, and in 1899 J. N. Rose included this plant, under the name *C. ficifolia*, among the useful plants of Mexico, where it is known as "Chilacayote." In 1911 the Boletin de Fomento of Costa Rica noted the same plant as one known and used by the inhabitants of Mexico before the European discovery of America, and the name "Chilacayote" is given in the Diccionario de Atzequismos of Robelo, together with a description of the plant taken from Hernandez. The name is formed from two Nahuatl words: Ayotli or gourd, and Tzilac, smooth or polished; it has also been applied to the water melon, but improperly, as the characters of the latter do not correspond to those of the "Chilacayote." The horticultural names "Melon de Malabar" and "Courge de Siam" should be abandoned in favor of one suggesting the true native locality of this plant, while the Latin name *Cucurbita melanosperma* A. Braun, under which it was listed in 1824, without any description, by the Botanical Garden of Carlsruhe, should give place to *C. ficifolia*, under which it was first described in 1837 by P. C. Bouché.—*M. F. Warner.*

1554. Guenther, Fritz. **Friedrich Lucas.** Gartenwelt 25: 180. 1921.—He was the son of Eduard Lucas, founder of the Pomologisches Institut in Reutlingen and was born Oct. 30, 1842. Following his education as a gardener, which included training in the Baltet nurseries in Troyes, France, he assisted his father in the Institut, succeeding him as its head in 1882, and continuing in active service there until his death, Apr. 21, 1921. He wrote a number of books on pomology, and a revision of the Christ-Lucas Gartenbuch.—*M. F. Warner.*

1555. Jackson, B. D., and Spencer Moore. **Æneas MacIntyre.** Jour. Botany 59: 204–205. 1921.—These notes refer to James Britten's bibliographical notes on the Compendium of Smith's 'English Flora.'—*S. H. Burnham.*

1556. Jacob, Joseph. **Lambert, knight of the golden tulip.** Gard. Chron. 69: 174–175. *Fig.* 75. 1921.—This presents evidence in support of the theory that John Lambert, one of Cromwell's generals, was the first person to flower the Guernsey lily in England.—*P. L. Ricker.*

1557. Jacob, Joseph. **William Turner, divine and herbalist. "It's an ill wind"—The father of British botany—His private gardens—His influence on horticulture.** Garden 85: 12. *Illus.* 1921.—His Libellus de re Herbaria Novus (1538) is famous as the 1st English botanical work ever printed; his Herbal was issued in 1551, the 2nd part in 1562 and 3rd in 1568; while the most complete edition was brought out after his death, by his son, Peter Turner.—*M. F. Warner.*

1558. Keller, C. **Gartenbaulehrer Dr. Alexander Bode. [Dr. Alexander Bode, instructor in horticulture.]** Möllers Deutsch. Gärtner Zeitg. 35: 76. 1920.—Bode died Feb. 13, 1920, in his 60th year. He was at one time employed by Sander of St. Albans as an orchid-collector, was later at the head of a nursery, but since 1899 had been a teacher, and had been chief instructor in agriculture in the Städtische Oberrealschule of Chemnitz since 1912.—*M. F. Warner.*

1559. Kern, F. D. **The J. Roberts Lowrie herbarium.** Torreya 21: 79–81. 1921.—The Lowrie herbarium was presented in August 1920 to the Pennsylvania State College. Mr. Lowrie took up his residence at Warriorsmark, Pennsylvania, in 1853, as legal adviser and

general manager of a large iron manufacturing concern. His leisure was largely devoted to the study of the local flora. *Aster Lowrieanus* Porter was named in his honor. He left an herbarium of 2750 specimens, representing 144 families and 707 genera. The grounds about his house were converted into an arboretum, which is still in a fair state of preservation.—*J. C. Nelson.*

1560. [Kirchner, Oskar von.] **Die Biologische Reichsanstalt für Land- und Forstwirtschaft in Berlin-Dahlem. [The biological institute for agriculture and forestry at Berlin.]** Zeitschr. Pflanzenkrankh. 31: 196–197. 1921.—The Institute has begun to publish monthly a Nachrichtenblatt für den Deutschen Pflanzenschutzdienst (Notes of the German plant protection service), of which the 1st issue appeared July 1, 1921, with an introduction on its aims and scope by Dr. O. Appel, the director. Dr. H. Morstatt, of the same Institute, has prepared a bibliography of plant protection literature for 1920, which is published by P. Parey, Berlin. It consists of titles arranged in 4 classes, with an author index.—*H. T. Güssow.*

1561. Knunker, A. **Hans Freiherr von Türckheim.** Gartenflora 70: 19–22. 1921.—Hans von Türckheim was born May 27, 1853, and died at Karlsruhe, February 7, 1920. He spent over 30 years as German consul in Guatemala, and made extended botanical explorations in that country. After returning to Germany in 1908, he made a botanical trip to the Santo Domingo mountains in 1909–10. His Guatemalan collections, comprising many new species described in Botanical Gazette by John Donnell Smith, are covered by the latter's Enumeratio Plantarum Guatemalensium (1889–1907), and his Santo Domingo plants are treated in Urban's Flora Domingensis, Vol. VIII of Symbolae Antillanae. Türckheim was especially interested in orchids, sending to Dr. Hans Goldschmidt of Essen living specimens of many which had never before flowered in Europe, while his herbarium material in this family, with exception of that which remains inaccessible in the Reichenbach Herbarium in Vienna, is being handled by R. Schlechter and comprises many new species.—*M. F. Warner.*

1562. Kronfeld, E. M. **Jacquin des Jügeren botanische Studienreise 1788–1790. Aus den unveröffentlichten Briefen herausgeben. [Botanical travels of Jacquin the younger. From unpublished letters.]** Beih. Bot. Centralbl. II, 38: 132–176. *Fig. 1.* 1921.—The botanical notes found in the letters of the younger Jacquin (Joseph Franz Freiherr von Jacquin) are printed without comment. The journey was planned to take in all the botanical gardens, factories, and other places where botanists and chemists were to be found. The route was as follows: Prag, Karlsbad, Freiberg, Dresden, Leipzig, Halle, Berlin, Klanzthal, Göttingen, Aschaffenberg, Mainz, Bonn, Aachen, Maestricht, The Hague, Rotterdam, Leyden, Amsterdam, Utrecht, Brussels, London, Paris, Freiberg, Geneva, Basel, Zurich, Bern. The letters are to his father, mother, and brother. They tell especially of the new or interesting plants found in each place and the botanists met.—*L. Pace.*

1563. L[acaita], C. C. [Rev. of: Béguinot, Augusto. **La Botanica.** *116 p.* Rome, 1920.] Jour. Botany 59: 147–148. 1921.

1564. Leclerc, Henri. **Histoire de l'ail. [History of garlic.]** Janus 23: 167–191. 1918. —A study of the properties of the plant rather than its history in cultivation is here presented. The earliest record of its use as food goes back to the period of Cheops, about 4500 B.C., as Herodotus related that there was engraved on the great pyramid of Ghizeh the cost of the horse-radish, onions, and garlic consumed by the builders, exceeding 1600 talents of silver. The use of garlic became known to the Hebrews during their sojourn in Egypt, and the Greeks used it largely; Theophrastus attaches much importance to its culture. The literary lore of garlic is represented by quotations from many sources, from Aristophanes down to Daudet, and its medicinal virtues are traced from Hippocrates, Dioscorides, Galen, and Pliny, and the Arab physicians, down to modern recognition of its stimulant and antiseptic properties, and in particular its value in the treatment of certain infectious diseases and tuberculosis.—*M. F. Warner.*

1565. LECLERC, HENRI. **La médecine des signatures magiques. [The doctrine of signatures in medicine.]** Janus 23: 5–28. *Fig. 1–7.* 1918.—Theories which have been held down to comparatively modern times concerning the relation between the medicinal virtues of plants and their external aspects are discussed in 3 groups: (1) Signatures having the form of an organ, as the black seeds of Herb Paris, having the signature of the pupil, yielding an oil used in ophthalmia; (2) signatures suggesting the consistency or color of a secretion, haemorrhages being treated with plants having a ruddy color or juice; and (3) signatures reproducing the aspect of a disease or injury, including plants the parts of which suggest teeth or fangs, which were used for bites of dogs or serpents.—*M. F. Warner.*

1566. LECLERC, HENRI. **Le cyprès. [The cypress.]** Janus 25: 87–100. 1921.—It is one of the trees oftenest mentioned in the Bible, and its longevity, fecundity, evergreen foliage, and other qualities are symbols which made it important in the religious cult of the Chaldeans. Greek mythology regards it as the emblem of death and has several tales to account for its origin; in Christian symbolism it signifies not only the death of the just, but also eternal life. It had various industrial and medicinal uses among the ancients; in the Middle Ages its medical properties were eulogized by St. Hildegarde, whom the author quotes at some length, as also Crescenzi, and the unknown author of the Arbolayre. In modern medical usage, it is a powerful vaso-constrictor, with effects equal or superior to those of **Hamamelis virginica.**—*M. F. Warner.*

1567. [LENDNER, ALFRED.] **M. Paul Chenevard.** Bull. Soc. Bot. Genève 12: 3. 1921.—This is a brief outline of the botanical activities of Chenevard, who died Dec. 30, 1919, in his 81st year.—*M. F. Warner.*

1568. LOCY, W. A. **The earliest printed illustrations of natural history.** Sci. Monthly 13: 238–258. *Fig. 1–10.* 1921.—In 1475 Conrad von Megenberg published his Puch der Natur, illustrated by woodcuts of plants and animals, which passed through 6 editions before 1500. There are 2 copies of the 1st edition in the J. Pierpont Morgan Library of New York from which the figures are reproduced. The Gart der Gesuntheit (Mainz, 1485) contained 386 figures of plants and animals, some of which show a high degree of excellence.—*L. Pace.*

1569. MARTELL. **Deutsche Pflanzennamen. [German plant names.]** Gartenwelt 24: 402–403. 1920.—For centuries there has been a rivalry between the Latin and vernacular names, but the Allgemeine Deutsche Sprachverein has thrown its influence in favor of the latter. This article gives origin and legends associated with many common German plants, and the derivation of some German names from those of other languages.—*M. F. Warner.*

1570. MARTINET, HENRI. **A nos lecteurs. [To our readers.]** Le Jardin 35: 57. 1921.—There is announced the consolidation of Le Jardin and Le Petit Jardin Illustré with Revue Horticole, under the latter name, and with Martinet, of Le Jardin, as one of its editors.—*M. F. Warner.*

1571. MARTINET, HENRI, ET FÉLICIEN LESOURD. **Avis à nos lecteurs. [Notice to our readers.]** Rev. Hort. 93: 323. 1921.—Announcement is made of the absorption of Le Jardin, edited by Martinet, by the Revue Horticole, the 1st issue of the combined journal being that of July, 1921.—*M. F. Warner.*

1572. MIELI, ALDO. **Gli scienziati italiani, dall' inizio del medio evo ai nostri giorni. Repertorio biobibliografico dei filosofi—matematici—astronomi—fisici—chimici—naturalisti—biologi—medici—geografi italiani. [Italian scientists from the Middle Ages to our own times; a biobibliographical dictionary of Italian philosophers, mathematicians, astronomers, physicists, chemists, naturalists, biologists, physicians, and geographers.]** Vol. I, Part 1. *viii + 236 p., illus.* A. Nardecchia: Rome, 1921.—This 1st part includes sketches of the following persons who have contributed in various ways to botanical science: Luca Ghini (about 1490–1556), Bartolomeo Maranta (about 1500–1571), Bonaventura Corti (1729–1813), Melchiorre Guilandino (about 1520–1589), Luigi Anguillara (about 1512–1570), Giovanni Battista Amici (1786–

1863), Antonio Piccone (1844–1901), Giovanni Zanardini (1804–1878), and Giovanni Passerini (1816–1893), by G. B. DE TONI; Roberto de Visiani (1800–1878), Prospero Alpino (1553–1616), and Giulio Pontedera (1688–1737), by A. BEGUINOT; Antonio Figari (1804–1874) and Giacinto Cestoni (1637–1718), by G. STEFANINI. Full bibliographies are given, and most of the sketches are accompanied by portraits, with occasional reproductions in fac-simile of manuscripts.—*M. F. Warner.*

1573. MORTIMER, A. **Wesley's "Primitive Physics" [sic].** Chemist and Druggist 94: 138–139. 1921.—The 1st edition of Primitive Physick is dated June 11, 1747, and the 32nd was published in 1828. This work, which was written during the busiest period of John Wesley's life, is devoted to remedies for common diseases and rules of health. The history of medicine is briefly outlined in its preface. The title-page of the 22nd edition (1788) is reproduced.—*M. F. Warner.*

1574. OAKLEY, R. A. **Dr. Tracy's retirement.** Amer. Flor. 56: 801–802. *Portrait.* 1921. —William Warner Tracy was born in Hudson, Ohio, May 2, 1845. Graduating from Michigan Agricultural College in 1867, he was for a short time professor of horticulture there, but soon went on a farm at Old Mission, Grand Traverse county, Michigan, and there began the growing of seed peas. His unusual knowledge of plants attracted the attention of D. M. Ferry & Co., and from 1879 to 1903 he was connected with that firm, organizing their field trials, compiling catalogues, and working on problems of plant selection. He became the foremost authority in the country on varieties of vegetables, and as such was called in 1903 to the U. S. Department of Agriculture, where he has remained until the present, but is now retiring from active work.—*M. F. Warner.*

1575. PAMMEL, L. H. **In memoriam. Dr. Byron D. Halsted.** Proc. Iowa Acad. Sci. 26: 31–33. 1919 [1920].—This is a brief sketch and appreciation of Dr. Halsted (1852–1918).—*M. F. Warner.*

1576. PEACHEY, G. C. **The two John Peacheys, seventeenth century physicians; their lives and times.** Janus 23: 121–158. *1 fig.* 1918.—Researches are reported into the history of 2 men who are often confounded: John Pechey (1654–1718), M.A.Oxon., licentiate of the College of Physicians, author of The Compleat Herbal (1694) and A Plain Introduction to the Art of Physick (1697); and John Peachie (about 1632–1692), M.D.Caen, extra-urbem licentiate of the College of Physicians, who wrote a treatise on the virtues of "Cassunmuniar" in 1679.—*M. F. Warner.*

1577. PRAIN, DAVID. **James Ramsey Drummond (1851–1921).** Jour. Botany 59: 174. 1921.—Drummond was an enthusiastic botanist, but published only a few papers, on *Agave, Furcraea, Grewia,* etc. Between 1874 and 1904 he served in the Punjab as Assistant Commissioner, District Judge, and Commissioner, and during his last months in the Indian Civil Service officiated as curator of the herbarium at the Royal Botanic Garden, Calcutta. On his retirement in 1905 he settled at Kew in the expectation of preparing a flora of the Punjab, but was obliged to abandon the project on account of failing health.—*M. F. Warner.*

1578. P[RAIN], D. **John Gilbert Baker 1834–1920.** Proc. Roy. Soc. London B 92: xxiv–xxx. 1921.—Baker had a long and productive career as systematic botanist, mainly at Kew. He "owed his eminence as a systematic botanist largely to the circumstance that his floristic and monographic studies alike are imbued with the spirit of the philosophical natural historian impelled by a sense of duty to attack taxonomic problems. . . . . He had fully apprehended the effects of environment before oecology became a special study." A complete account of outstanding works and professional distinctions is given.—*Paul B. Sears.*

1579. RITZEMA BOS, J. **Mijn afscheid uit mijne ambtelijke betrekking. [My retirement from official relations.]** Tijdschr. Plantenz. 26: 193–196. 1920.—In a brief introduction the author refers to the presentation of his portrait by his friends on Aug. 24. A list of the speakers on this occasion is given, followed by the speech of acceptance by the author.—*H. H. Whetzel.*

1580. Roster, Giorgio. **Odoardo Beccari.** Bull. R. Soc. Toscana Ortic. **46**: 33-36. *Portrait.* 1921.—A brief account is given of the explorations and collections of Beccari (died Oct. 26, 1920), with a list of his principal writings on the Phoenicaceae. Other works which were left in manuscript are to be published by the writer.—*M. F. Warner.*

1581. Russell, E. J. **The first printed book on agriculture.** Country Life [London] **43**: 276-278. *Illus.* 1918.—Notes are given on the Opus Ruralium Commodorum of Petrus Crescentius, 1st edition, printed at Augsburg by Johannes Schüssler in 1471.—*M. F. Warner.*

1582. Siebert, August. **Max Hesdörffer.** Gartenwelt 24: 37-38. *Portrait.* 1920.—An obituary sketch is given of Hesdörffer (1863-1920), former editor of Gartenwelt, and author of a number of books on flower and ornamental gardening.—*M. F. Warner.*

1583. Solis, Octavio. **Importancia de los jardines botánicos y algunas especies vegetales exóticas. [Importance of botanical gardens and some exotic plants.]** Rev. Agric. [Mexico] **6**: 78-84. *12 fig.* 1921.—A brief history of botanical gardens is given with a discussion of the value of such institutions. Attempts to build up gardens at Oaxaca and elsewhere in Mexico are related. A few rare exotic plants are described.—*John A. Stevenson.*

1584. T., C. **The origin of the name Clivia.** Garden **85**: 219. 1921.—Clivia was so named after the Duchess of Northumberland, a member of the Clive family, according to Johnson's Gardener's Dictionary, which does not state which Duchess, though the ducal title was instituted in 1766.—*M. F. Warner.*

1585. W[atson], W[illiam]. **Henry F. C. Sander.** Kew Bull. **1921**: 33. 1921.—Sander, who died Dec. 23, 1920, in his 74th year, was head of the firm of Messrs. Sander and Sons of St. Albans and Bruges, the principal importers for many years of orchids and other tropical and subtropical plants. [See also Bot. Absts. 10, Entry 1536.]—*M F. Warner.*

1586. Weatherby, C. A. **Old-time Connecticut botanists and their herbaria—II.** Rhodora **23**: 121-125, 171-177. 1921.—This gives a short biographical sketch of Joseph Barratt, born in Derbyshire, England, in 1796, died at Middletown, Connecticut, Jan. 25, 1881. He emigrated from England to New York, in 1819, where he practised as a physician. He spent most of his life in Connecticut as physician, teacher, botanist, and geologist. His herbarium, preserved at Wesleyan University, is probably his most substantial and valuable achievement. His publications are here listed and the more important ones briefly discussed.—*James P. Poole.*

1587. Wense, H. von der. **Forst- und Jagdgeschichtliches aus einer Lüneburgischen Gutsforst. [History of forestry and game on a Lüneburg estate.]** Zeitschr. Forst- u. Jagdw. **51**: 210-215. 1919.—An interesting account is given of the first application of forest methods by Christian F. L. von der Wense on the family land during the 18th century, and subsequent forest history. Wense took especial interest in the reforestation of heath lands by plowing and planting. The first planting was done by sticking into the ground pine twigs to which the cones were still attached, but the result was a failure.—*J. Roeser.*

1588. Winton, A. L. **Thomas Franz Hanausek.** Amer. Jour. Pharm. **93**: 222-227. *Portrait.* 1921. These reminiscences present an insight into the keen scientific acumen and inspiring character of Thomas Franz Hanausek, who died at Vienna, on February 4, 1918, in his 66th year. The accompanying photograph bears Hanausek's signature and the motto to which he owed his success, "Das Beste im Leben ist die Arbeit."—*Anton Hogstad, Jr.*

1589. Zahn, E. **Nachruf.** Gartenwelt 24: 472. 1920.—This is an obituary of Han-Solereder (1860-1920), professor of botany and director of the Botanical institute and botanical garden of the University of Erlangen.—*M. F. Warner.*

1590. Zaunick, Rudolph. **Johannes Kentmann, 2. April 1518 bis 14. (oder 15.) Juni 1574.** Mitteil Gesch. Med. u. Naturwiss. 18: 177–183. 1919.—Kentmann, a physician of Meissen, in Saxony, published works on the fishes, birds, and fossils of that region. He contributed to botanical science through his correspondence with Conrad Gesner, and his manuscript "Kreutterbuch" with 600 beautifully painted plates, which was dedicated in 1563 to the Elector August of Saxony, is now preserved in the national library at Dresden. He was the father of Theophilus Kentmann (1552–1610).—*M. F. Warner.*

1591. Zeininger. **Aus der Geschichte der Pfaueninsel. [History of the "Peacock Isle."]** Gartenflora 69: 154–159. *Fig. 19–23.* 1920.—Garden development of the banks of the Havel at Potsdam began under the Great Elector (1640–1688), with a vineyard and the setting of many trees, and on the "Peacock isle" with its beautiful oaks, he built a hunting lodge. It was for some time neglected, but under Friedrich Wilhelm II (1788–1797) considerable planting was done, and a gardener named Morsch was placed in charge of the island. Under Friedrich Wilhelm III (1797–1840) the planting was completed, Sans Souci and the "New Garden" contributing trees for the purpose. The succession of gardeners and erection of buildings are noted for this period of greatest development, after which the "Peacock Isle" has declined in magnificence, though always remaining a favorite resort.—*M. F. Warner.*

BOTANICAL EDUCATION

C. Stuart Gager, *Editor*

Alfred Gundersen, *Assistant Editor*

1592. Anonymous. **Instrucciones para la formación de huertas escolares. [Instructions for making school gardens.]** Bol. Agric. Provincia Buenos Aires 1[9]: 2–5. 1920.

1593. Anonymous. **The University of California wood exhibit.** Intercoll. Forest. Club Ann. 1: 28–29. *1 illus.* 1921.

1594. Anonymous. [Rev. of: Cook, M. T. **College botany: structure, physiology and economics of plants.** *x + 392 p.* J. B. Lippincott Co.: Philadelphia and London, 1920.] Nature 107: 807. 1921.

1595. Anonymous. [Rev. of: Small, J. **A textbook of botany for medical and pharmaceutical students.** *x + 681 p.* J. and A. Churchill: London, 1921.] Nature 107: 777. 1921.

1596. Hanson, C. O. **Forestry for woodmen.** *2nd ed., 228 p., 13 pl., 16 fig.* Clarendon Press, Oxford. 1921.—The book is based on Schlich's Manual of Forestry and is written to supply an inexpensive book on scientific forestry for foresters and woodmen. It was first drawn up for use of the School of Forestry for Working Men in the Forest of Dean. The work consists of 18 chapters, 2 of which, "The forestry act and forestry commission," and "The afforestation of waste lands," are not in the first edition.—*C. S. Gager.*

1597. Hastings, G. T. **The Boy Scouts and conservation of wild flowers.** Torreya 21: 83–84. 1921.—A merit badge is now offered to Scouts for the collecting, mounting, and labeling of 50 specimens of flowering plants. An essay of 200 words on the conservation of wild flowers is also required. Scouts are trained to protect plants and cautioned not to gather rare flowers.—*J. C. Nelson.*

1598. Joly, J. **The universities and research.** Nature 107: 760–761. 1921.—(From a paper read before the Congress of the Universities of the Empire, at Oxford, on July 8.) "Perhaps the most striking feature of American universities, as viewed by a British visitor, is the prevalence of research and the lavish provisions made for its prosecution." Compulsory study of dead languages is considered seriously injurious to research in physical and natural sciences in that it keeps many out of the universities and consumes time which were better spent in study of living languages. Even a little elementary research is of great value

to the student. Lectures should be devoted to studies in research; these might be substituted for part of the regular lectures.—*O. A. Stevens.*

1599. Möller. **Die Zukunft des höheren förstlichen Unterrichts in Preussen.** [**The future of higher forest instruction in Prussia.**] Zeitschr. Forst- u. Jagdw. 51: 353–400. 1919.—This academic discussion of the future of forest instruction in Prussia consists of 3 parts: (1) The question of the future of forest instruction in Prussia remains unsolved, and although there exists a present period of inactivity, efforts will have to be exerted to change existing conditions. (2) Raising the standard of the forest academies and the possible transfer of forest instruction to a university. Under present conditions, 2 forest academies cannot exist in Prussia, and the only evident solution in the author's opinion is to concentrate all instruction at the Eberswald academy. (3) How the forest academy of Eberswald can be developed into a full-fledged high school of forest instruction.—*J. Roeser.*

1600. Nichols, George E. [Rev. of: Martin, J. N. **Botany with agricultural applications.** *xii+604 p. 490 fig.* John Wiley & Sons: New York, 1920.] Torreya 21: 65–66. 1921.—This 2nd edition is designed as a text for agricultural students. Its aim is to teach the fundamental facts and principles of botany and relate these to problems of practical interest. [See also Bot. Absts. 8, Entry 1821.]—*J. C. Nelson.*

1601. R., A. B. **Four new text-books.** [Rev. of: (1) Jones, W. Neilson, and M. C. Rayner. **A text-book of plant biology.** *viii+262 p., 6 pl.,* 36 *fig.* Methuen: London, 1920. (2) Cook, Melville Thurston. **College botany, structure, physiology and economics of plants.** *x+392 p.* Lippincott: Philadelphia and London, 1921. (3) Ashton, Percival J. **The Selborne botany for schools.** *viii+152 p.* G. Gill: London, (no date). (4) Martin, John H. **Botany with Agricultural applications.** *2nd rev. ed., xii+604 p., 490 fig.* Wiley: New York, 1920.] Jour. Botany 59: 114–116. 1921. [See also Bot. Absts. 8, Entry 1821.]

1602. R., A. B. **Two text-books.** [Rev. of: (1) Small, James. **A text-book of botany for medical and pharmaceutical students.** *x+681 p., 1350 fig.* Churchill: London, 1921. (2) Ballard, C. W. **The elements of vegetable histology.** *xiv+246 p., 75 fig.* Wiley: New York; Chapman and Hall: London, 1921.] Jour. Botany 59: 236–237. 1921.

1603. Sosman, Robt. B. **The distribution of scientific information in the United States.** Jour. Washington [D. C.] Acad. Sci. 11: 69–99. 1921.

CYTOLOGY

Gilbert M. Smith, *Editor*
Geo. S. Bryan, *Assistant Editor*

(See in this issue Entries 1677, 1685, 1716, 1717, 1720, 1871)

ECOLOGY AND PLANT GEOGRAPHY

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(See in this issue Entries 1608, 1625, 1626, 1628, 1651, 1817, 1818, 1823, 1837, 1840, 1841, 1843 1844, 1846, 1940, 2000, 2001, 2003, 2004, 2009, 2010, 2011, 2015, 2029, 2047)

FOREST BOTANY AND FORESTRY

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(See also in this issue Entries 1465, 1547, 1587, 1593, 1596, 1599, 1784, 1878, 1882, 2027, 2028)

1604. Anonymous. **Das Ergebnis der Harzgewinnung in Preussen.** [**The yield from the resin industry in Prussia.**] Zeitschr. Forst- u. Jagdw. 51: 415–416. 1919.—For the fiscal year 1918, 2,288,661 kgr. of pine resin were produced at a cost of 4,187,186 marks, and 63,416 kgr. of Norway spruce resin at a cost of 42,434 marks. The net profit from the former was 117.05 marks, from the latter 83.08, and from Norway spruce wild resin (Fichtenwildharz) 50.95 marks per 100 kgr. It is believed that these returns should induce private forest owners to devote their holdings to the production of resin.—*J. Roeser.*

1605. Anonymous. **Forestry in the Union. The progress of state afforestation.** Jour. Dept. Agric. Union of South Africa 3: 155–159. 1921.—The policy of the Forest Department is to protect and conserve the indigenous timber forests and to utilise their products in such a way as to increase future productivity. The supply of timber will gradually become exhausted from these forests, which reproduce comparatively slowly. The future of forestry in South Africa therefore lies in the plantations of exotic trees, which are gradually being extended.—*E. M. Doidge.*

1606. Anonymous. **La madera de eucalipto.** [**Eucalyptus wood.**] Información Agric. [Madrid] 11: 243–244. 1921.—This is a discussion of the rate and manner of drying eucalyptus wood.—*John A. Stevenson.*

1607. Anonymous. **Quebracho.** Sci. Amer. Monthly 1: 189. 1920.

1608. Anonymous. **The Alexandria forests.** South African Gard. 11: 217–219, 257–276. 1921.—The Alexandria forests crown the 1st terraces of the coastal zone for some 30 miles. An account is given of the vegetations of these forests under 3 headings, littoral forests, private forests, and government forests.—*E. M. Doidge.*

1609. Anonymous. **The progress of British forestry.** [Rev. of: **First annual report of the forestry commission.** H. M. Stationery Office: London, 1921.] Nature 107: 753–754. 1921.

1610. Anonymous. **Utilidad de los arboles.** [**Use of trees.**] Inspección Nacion. Ganaderia y Agric. [Uruguay] Bol. 3 [2nd ed.]. *18 p.* 1920.—This popular discussion of the uses of forest products (wood, fruit, etc.), and the benefits derived from forest plantings includes directions for the planting and care of tree plantations.—*John A. Stevenson.*

1611. Alviella, Felix Goblet, d'. **La flore forestière dans la region des lacs italiens.** [**The forest flora in the region of the Italian lakes.**] Bull. Soc. Centrale Forest. Belgique 23: 573–589. *Fig. 1–3.* 1920.—The development of numerous introduced species is discussed, among others *Pinus palustris, Sequoia gigantea, S. sempervirens, Picea pungens,* and *P. Engelmanni.* Excellent development is reported for the species which were planted on the alluvial soils near the lake shores.—*W. C. Lowdermilk.*

1612. Arnold, H. H. **Aerial protection for our national forests.** Intercoll. Forest. Club Ann. 1: 13–16. 1921.—This article outlines the results of the first 2 years' aerial patrol in California.—*Woodbridge Metcalf.*

1613. B. **Les Douglas de Sibret.** [**The Douglas fir plantations of Sibret.**] Bull. Soc. Centrale Forest. Belgique 23: 453–460. 1920.—The remarkable growth of a Douglas fir plantation established in 1872 and 1878 by Count Visart is described. Unfortunately this plantation was cut by the German army.—*W. C. Lowdermilk.*

1614. BARRETT, L. A. **Municipal camps in the national forests.** Intercoll. Forest. Club Ann. 1: 21–24. 1921.

1615. BORNEMANN, CRIST. ERNST. **Ist es wirklich paradox, da ferner Eichen- und Büchenholz anzuziehen, wo viele Jahrhundert grosse und geschlossene Eichen- und Büchenwaldungen gewesen, und streitet solches so sehr gegen Analogie, Erfahrung und Natur, als in 43ten und 44ten St. dieses Magazins angegeben worden? [Is it really a paradox to reproduce oak and beech in localities formerly occupied for centuries by large and dense stands of oak and beech, and does this argue so strongly against analogy, experience, and nature, as was indicated in the 43rd and 44th issue of this magazine?]** Zeitschr. Forst- u. Jagdw. 51: 106–109. 1919.—Forest soils contain, partly in themselves, partly as supplied by the existing stand, enough elementary ingredients to perpetuate and reproduce oak and beech stands. Otherwise such stands could not continue in the same locality for centuries, when the trees do not seed farther than the periphery of their crowns. The writer considers failures as due entirely to specific local conditions which hinder reproduction.—*J. Roeser.*

1616. BROWN, N. C. **Spain and her scanty forests.** Amer. Forest. 27: 135–139. *11 fig.* 1921.—Forestry in Spain dates from 1835. The practice is more along aesthetic lines than in any other country. The forests consist very largely of pine and oak, though Eucalyptus and California redwood are common. In reforestation the European poplar is used extensively in the lower valleys and maritime pine in the mountains. Of the scant 12,000,000 acres of forest, properly so called, practically ⅔ are privately owned.—*Chas. H. Otis.*

1617. BUTLER, O. M. **Research and boards. Need of establishing laboratories to study the problems of the lumber industry.** Sci. Amer. Monthly 3: 59–62. *6 fig.* 1921.

1618. COOLIDGE, P. T. **The situation in the pulp-wood region.** Intercoll. Forest. Club Ann. 1: 17–18. 1921.

1619. CRAHAY, N. I. **A propos du grand incendie de 1911 au voisinage de la Baraque Michel. [Concerning the big forest fire of 1911 in the vicinity of Michel Barracks.]** Bull. Soc. Centrale Forest. Belgique 23: 343–356, 391–405. 1920.

1620. CRAHAY, N. I. **La question forestière, question mondiale. [The forestry question is world wide.]** Bull. Soc. Centrale Forest. Belgique 23: 259–263. 1920.—Inasmuch as the world supply of wood is being consumed at an alarming rate, the attention of the League of Nations should be directed to the necessity of conserving the forests and to the afforestation of unproductive lands. The treatment of the forests on watersheds of international rivers should be governed by treaties. Only 8 countries (Austria, Hungary, Norway, Sweden, Finland, Russia, U. S. A., and Canada) are exporters. The reserve is already threatened, and only 3 countries (Sweden, Finland, and Canada) have a future in exports.—*W. C. Lowdermilk.*

1621. DRION, R. **Impôt forestier: Modifications. [Modifications in forest taxation.]** Bull. Soc. Centrale Forest. Belgique 23: 431–453, 491–511, 553–573. 1920.—This report is divided into 2 parts, the 1st being devoted to an account of legislation since 1826, and the 2nd to a discussion of past legislation and the application from the forester's point of view of a recent taxation law.—*W. C. Lowdermilk.*

1622. DRION, R. **Impôt forestier: Modifications. [Modifications of forest taxation.]** Bull. Soc. Centrale Forest. Belgique 24: 11–19. 1921.—This is a supplementary discussion of the report of the Commission Special, Conseil Superieur des Forêts [see preceding entry].—*W. C. Lowdermilk.*

1623. EBERTS. **Empfehlenswerte Holzfällungs-maschinen. [Recommended wood-felling machines.]** Zeitschr. Forst- u. Jagdw. 51: 248–260. *Fig. 1–9.* 1919.—On the 14,000,000 hectares of forest land in Germany 24,000,000 cu.m. of sawtimber and 30,000,000 of fuel wood

(value 220,000,000 marks) are produced annually. In removing fuel wood, the stumps also are taken in many localities. Büttner has constructed 3 machines, "Baumwinde," "Hebelbaumrode machine," and "Zahnleisten-Waldteufel." The 1st may be used to push or pull over trees, the 2nd is a pushing machine, and the 3rd a pulling machine. Where thinnings and partial fellings are made, the pushing machines, which can control the fall, are preferred. The pulling machines are primarily for final and clear cuttings. In 80–90-year old spruce, beech, and oak stands, the 3rd machine can pull down 20–25 trees at a time, and 200–250 trees in a day.—*J. Roeser.*

1624. ECKBO, NILS B. **Industrial timber research abroad and in South Africa.** South African Jour. Indust. 4: 534–539. *6 fig.* 1921.—This, the 1st installment of a series of articles on the subject, gives an account of research institutions in the U. S. A., India, Canada, Australia, and England. The elimination of waste and improved utilization of forest products are essential in view of the world shortage of timber.—*E. M. Doidge.*

1625. FANKHAUSER. **Zur Kenntnis der Lärche. [The larch.]** Zeitschr. Forst- u. Jagdw. 51: 289–297. *Fig. 1–3.* 1919.—The degree of thrift and range of the larch depends upon plentiful and permanent soil moisture, not upon depth of soil. Surface dryness is overcome by the deep-growing main root and subsidiary "Senkerwurzeln," which often attain a length of 9 m. The enormous water loss by transpiration (as compared with spruce, pine, beech, etc.) is believed to explain the fact that larch is the only native deciduous conifer. The shedding, according to the author, avoids a conflict between transpiration and reduced water absorption. In extraordinary drought, larch maintains itself by its capability of shedding its foliage. Larch in mixture with Norway spruce (*Picea excelsa*) fails, not because of greater intolerance, but because the crown cover of spruce prevents precipitation from reaching the soil, while the shallow wide-spreading network of roots gradually produces a condition of dryness unfavorable to larch. Larch thrives in mixture with pine and beech, as neither of these effectively intercepts precipitation or competes for moisture as does spruce. In beech stands the surface layer of leaves effectively prevents surface desiccation.—*J. Roeser.*

1626. FRÖMBLING, C. **Achtet der niederen Pflanzenwelt! [Consider the lower vegetable kingdom!]** Zeitschr. Forst- u. Jagdw. 51: 33–37. 1919.—According to the author the lower forms of plant life in the forest offers a reliable indicator in solving many otherwise difficult problems. He expects that little success in natural regeneration will be attained by anyone not familiar with these plants. In general, the more productive a soil, the more abundant its lower flora, and the less the likelihood that a single species will become dominant. Conversely, the poorer a soil, the more meagre the plant covering, and the greater the chances of supremacy by a single species.—*J. Roeser.*

1627. GOOR, E. **En Perse.—Notes de voyage en octobre–novembre 1913. [In Persia:—notes of a journey from October to November 1913.]** Bull. Soc. Centrale Forest. Belgique 24: 1–11. 1921.

1628. GUTHRIE, J. D. **On the Murman coast.** Amer. Forest. 27: 155–159. *10 fig.* 1921.—The Murman coast is a part of Russian Lapland stretching from North Cape to the White Sea. This article touches here and there on the vegetation and forest growth of the region.—*Chas. H. Otis.*

1629. HAMMATT, R. F. **California's redwoods and her highways.** Intercoll. Forest. Club Ann. 1: 19–20. 1921.

1630. HEMMANN. **Forstliche Organization. [Forest organization.]** Zeitschr. Forst- u. Jagdw. 51: 401–406. 1919.—The profession of forestry in Germany has, up to the present time, failed to present a consolidated working unit. The forest superintendents (Ober-Förster) have organizations in practically all German states, and in several instances the lower classes of forest employees are united; but there is a more or less distinct line between these and the organizations of the separate states, which the author describes in detail. By

far the most efficient society is the recently organized Thüringia society of forest administrative officers, who are working toward scientific and politico-economic development of forestry and forest management and toward the consolidation of all the German societies of forest administrative officers into a national society. A meeting was planned for June 14-15, 1921.—*J. Roeser.*

1631. Henry, Augustine. **The tallest yews in Europe.** Country Life [London] 50: 9-10. *2 fig.* 1921.—Professor Badoux has recently claimed that a yew 70½ feet high, growing wild in the forest of Chillon, Switzerland, is the tallest in Europe; but the Close Walks, near Midhurst in England, contain 3 trees respectively 89, 90, and 92 feet high. These are probably about 260 years old. In China and Japan the yew grows only about 50 feet high, but in western North America occasionally reaches 80 feet. The tall specimens of Midhurst probably are not surpassed in height, unless it be in the Himalayas.—*M. F. Warner.*

1632. Hertz. **Staatsaufsicht fur den Privatwald.** [State supervision of private forests.] Zeitschr. Forst- u. Jagdw. 51: 177-184. 1919.—The author is opposed to communism in the forest as advocated by Kordvahr and Merten. He claims that in many instances small private forests are the only means of holding farmers on the land, and that with the sale of these private holdings to the state, the farmers will join the urban population. Many small private forests are better managed than the average state forests and in a way which better suits the economic needs of the country and secures the best use of forest labor. The state should aid private forests primarily by a good forest law, which, for the large forest, should provide for both regular technical supervision and forest organization. The law might also cover the much discussed subject of "capital cuttings," and help forest owners by providing loans which approximate the interest on capital invested in growing stock.—*J. Roeser.*

1633. Holmes, J. S. **Damage to forests by hail in North Carolina.** Monthly Weather Rev. 49: 333. 1921.—A hail storm on April 28, 1921, did much damage in North Carolina forests, killing much young growth, defoliating trees, and breaking branches, and so weakening many of the pines that they will be easy victims of the pine beetle.—*E. N. Munns.*

1634. Homans, G. M. **Eighth biennial report of the State Board of Forestry of the State of California, 1919-20.** *64 p., 5 illus.* 1921.—This report quotes the act of 1919 creating a State Board of Forestry and outlines a state forestry policy for California under 4 important headings: (1) Control of forest fires; (2) disposal of slash; (3) acquirement of cut-over lands; (4) survey of watershed areas. Complete minutes are given of the meeting of the lumbermen of California with the State Board of Forestry on Nov. 5, 1920, which culminated in a roll call on the slash-disposal question. All present agreed to dispose of their slash. Since then 260 operators have agreed in writing to dispose of their annual slash in such a manner as to lesson fire hazard and save young growth. The new fire protective organizations of the state are described, and statistics on causes of fires, areas (by counties) burned over, etc., are given. Announcement is made of a state forest nursery on a 30-acre tract near Davis, where trees will be raised for forest and highway planting. A test of white fir (*Abies concolor*) and cottonwood (*Populus fremontii*) as substitutes for Sitka spruce (*Picea sitchensis*) for butter boxes, carried on at the Davis farm, resulted in the decision that both species give entire satisfaction when the boxes are properly paraffined and lined with parchment paper.—*Woodbridge Metcalf.*

1635. Jameson, F. Walton. **Notes on tree-planting in the Kimberley District.** South African Jour. Indust. 4: 504-511. 1921.—The country about Kimberley is hot, dry, and dusty, but at many of the railway stations trees have been established and are growing well. Most of the natural timber from Mafeking to many miles south of Kimberley has been felled and the veld, unprotected by trees, is subject to the full hot blast of the northwest winds. With due care certain hardy trees can be successfully grown, and for this purpose *Eucalpytus rostrata, Cypressus arizonica, Pinus halepensis,* and *P. longifolia* are recommended. Experimental plots have been planted in Kimberley.—*E. M. Doidge.*

1636. Kienitz, M. **Vorschläge für die Hartznutzung 1919 auf Grund der Beobachtungen und Versuche in Chorin. [Suggestions on the tapping for resin, based on observations and experiments in Chorin.]** Zeitschr. Forst- u. Jagdw. 51: 6–32. *8 fig.* 1919.—The author describes in detail the results of experiments on tapping for resin, with especial reference to depth and width of wounding, location of wound, location and kind of receptacles, loss of resin by evaporation, kinds of cutting tools, etc. As a rule, each tree receives 2 blazes, on opposite sides, aggregating ⅔ of the circumference. Cutting is begun above and continued downward, and is done every 2 days. A new tree is tapped as near the root swelling as possible, and in all cases the vessels are attached low enough to permit a summer's cutting without moving the vessel. To prevent loss of turpentine oil by evaporation, the resin is removed promptly.—*J. Roeser.*

1637. Kienitz, M. **Was ist denn jetzt Mode: Saat oder Pflanzung? [What is the present style: sowing or planting?]** Zeitschr. Forst- u. Jagdw. 51: 417–436. *Fig. 1–9.* 1919.—Present conditions in Germany, large areas of cut-over land lying bare and man-power scarce, have developed the practice of producing new stands of pine by plowing, sowing with drill machines, and replacing failures by planting. As post-war conditions disappear, it is believed planting will again come into use. Natural regeneration is secured only after heavy seed years, and then only on areas entirely open, or shaded only at the side. Artificial sowing is successful only when the seedlings have a continuous moisture supply, since ordinarily a superficial root system is developed under the influence of the surface humus layer, and the plants therefore succumb easily during periods of drought. Planting is regarded as the only successful method, as a deep root-system is developed and the loosened soil in the planting holes brings about a better distribution of moisture. The author's experiments show that planting with a semi-conical spade produces better results and is cheaper than the other more elaborate planting methods, and that the cost of planting, calculated through the first 3 years, is actually less than the cost of sowing.—*J. Roeser.*

1638. Knesebeck, von. **Der Verkauf von Holz zur Selbstwerbung und Massnahmen zur Bekämpfung der Brennholznot auf dem Lande. [The sale of wood for removal and measures to be taken in combating the fuel-wood shortage.]** Zeitschr. Forst- u. Jagdw. 51: 83–97. 1919.—The author calls attention to the merits, in war and post-war times, of the new practice of letting the customer remove his own wood under the supervision of foresters, and outlines management plans for sales of sawtimber and removal of faggot wood under the system of "self-felling." A set of rules for controlling the fuel-wood supply and demand in the country is also given.—*J. Roeser.*

1639. Kordvahr. **Der Wert von Waldbeständen. [The value of forest stands.]** Zeitschr. Forst- u. Jagdw. 51: 140–144. 1919.—Forest prices are not determined by the interest with which the yield is capitalized, but by conditions which are independent of the yield. The difficulty of evaluating forest lands is due to the fact that only part of the principle can be converted into capital at once (tangible value), the remainder attaining its full value only after a long time (intangible value). The profit is the sum of the excess in the value of the increment over the expenses; the sum of the yearly savings, with interest, is derived from the cultural expenses and is comparable to the final value of a rental which is paid at the close of each year and finally at the final cutting. The author regards it as noteworthy that the value of stands is greater when calculated by simple interest than by compound interest, even though a rate as low as 1 per cent is chosen for compound interest. The writer includes numerous equations for calculating values.—*J. Roeser.*

1640. Kordvahr. **Gedanken über Zweck und Ziel der Forstwirtschaft. [The purpose and the goal of forest management.]** Zeitschr. Forst- u. Jagdw. 51: 1–6. 1919.—The question to be considered is whether a stand is to be managed to produce a maximum rate of interest or a product of greatest value. The author urges that the ethical and aesthetic values of the forest should be cultivated in preference to the material, and that the German forests should not be managed by those financially interested, but should be controlled by the state or community.—*J. Roeser.*

1641. KORSTIAN, C. F. **Grazing practice in the national forests and its effects on natural conditions.** Sci. Monthly 13: 273–281. *Fig. 1–7.* 1921.—This is a brief statement of the problems and conditions affecting the question of when and how much grazing may be allowed, and of the advantages and disadvantages of forest grazing.—*L. Pace.*

1642. KRAUSSE, ANTON. **Beobachtungen an Dasychira pudibunda L. gelegentlich des Eberswalder Frasses 1917. [Observations of Dasychira pudibunda in connection with the Eberswald attack of 1917.]** Zeitschr. Forst- u. Jagdw. 51: 265–272. *Fig. 1–9.* 1919.—The species was observed in limited numbers in Eberswald during 1915 and 1916, and in the fall of 1917 appeared in enormous numbers, devastating the beech forests and attacking the hornbeam. Pine trees, too, were infested but no needles were consumed. No satisfactory explanation has been offered for this infestation, migration being out of the question. The color variation in the caterpillars was of interest, black ones being in the majority. All caterpillars were diseased ("polyederkrank"). The hair of the caterpillar produced no disagreeable effects in contact with the skin, though it is generally considered extremely irritating. [See also Bot. Absts. 10, Entry 1644.]—*J. Roeser.*

1643. KRAUSSE, ANTON. **Ennomos quercinaria Hfn. (Lep. Geom.) als Waldverderber. [Ennomos quercinaria Hfn. (Lep. Geom.) as a destroyer of forests.]** Zeitschr. Forst- u. Jagdw. 51: 153–159. *Fig. 1–6.* 1919.—This insect, reported as a forest pest for the 1st time in 1917, appeared in the forest district of Saarbrücken. Suppressed beech were attacked first in May; dominant trees, 80–100 years old, later. The pupa is easily identified by 4 large hook-like appendages at the posterior end and 2 smaller appendages on each side nearby. The butterfly's habits and life history are described.—*J. Roeser.*

1644. KRAUSSE, ANTON. **Über Dasychira pudibunda L. bei Eberswalde 1918. [Dasychira pudibunda in the Ebers forest in 1918.]** Zeitschr. Forst- u. Jagdw. 51: 445–447. *1 fig.* 1919.—This is a brief account of further studies of *Dasychira pudibunda*. All eggs, caterpillars, and butterflies examined were "polyeder" diseased, though many individuals are apparently immune. Although the disease caused terrific destruction during 1917, it did not prevent a light devastation by this insect in 1918.—[See also Bot. Absts. 10, Entry 1642.]—*J. Roeser.*

1645. LAVARRE, W. **Brazil's white gold.** Sci. Amer. Monthly 3: 133–136. *5 fig.* 1921. [Abstract from Bull. Pan American Union 50: 462–476. 1920.—This is an account of the primitive methods still used in collecting the milk of the rubber tree.—*Chas. H. Otis.*

1646. LINDSAY, H. A. F., AND C. M. HARLOW. **Report on lac and shellac.** Indian Forest Rec. 8[1]: 1–162. *10 charts, 4 pl., 1 map.* 1921.—Despite its importance to India, lac is still collected in a crude and wasteful manner, mostly from wild forest trees by ignorant native villagers, and marketed without economic foresight. Scientific knowledge of the lac insect and its hosts, of the physiological processes involved in lac production, and of climatic and other influencing factors, is meagre; and research has been unaccountably neglected.—The lac insect, *Tachardia lacca*, sucks the juices of the host plant and produces an unusually massive secretory or excretory incrustation. This is the amber-colored, resinous lac, from which shellac is manufactured. The female insect lives about 6 months, and produces 2 broods of minute larvae, which emerge in "swarms" during the time the lac harvests are made. Only the more obvious phases of the life history are known. In addition to the physiological processes involved in lac formation, some of the problems awaiting solution are: Effect (upon quality of lac) produced by the amount and quality of food obtained from the 6 or 7 major and 15 or more minor host plants; vitality and hardiness of the several strains of lac insects and their efficiency as lac producers; effect of weather and climatic conditions upon the efficiency of the insect; natural enemies of the insect and of the host plants. Considerable work has been done upon the last question in the way of identifying the more important parasites of the lac insect; but little is known of their habits, life histories, and distribution, or of their relative destructiveness, and means of combating them. The best lac is the "kusmi," or winter crop, from the kusum tree (*Schleichera trijuga*) found in the sub-

Himalaya area, Chota Nagpur, Orissa, and Burma. This tree occurs scattered in high dense forests, grows very slowly, and pollards less vigorously than most other lac host trees. Cultivation by the natives is unintelligent, and, as high lac prices lead to excessive harvesting, the brood lac supply is depleted. Methods of controlling the infection of new host branches or trees by new broods are particularly haphazard and their study and improvement is urgently needed. Quality of lac varies with host and insect, season, and locality. Present practices are described in detail and suggestions for improved practice and needed investigation are given.—*C. L. Hill.*

1647. MUELLER, M. L. **Kiln drying more lumber on the Pacific Coast.** Intercoll. Forest. Club Ann. 1: 35–37. 1921.

1648. MÜLLER. **Forstliche Mitteilungen aus dem preussischen Solling.** [Forest information from the Prussian Solling.] Zeitschr. Forst- u. Jagdw. 51: 225–247. 1919.—The author describes the geology, climate, forest, hunting, and chief administrative features of the forest-inspection district of Hildesheim-Solling and of the adjacent state forests of Northeim, Moringen, and Einback, which include approximately 36,035 hectares. The forest in this district is 60 per cent beech, 30 Norway spruce, and 10 oak. The principle aim is to perpetuate the beech, which is increasingly valuable. On the Bunter sandstone formation, which predominates in the Solling, good masts alone produce results, and these occur, on an average, every 8 years. The failure of reproduction on sandstone is due to destructive fungi, which thrive in insufficiently decomposed leaf humus. Failure to secure beech reproduction naturally has led to a system of seed fellings based on 4 preparation fellings extending over 20 years, a seed felling, and final cuttings. It is preferred that the soil litter decompose naturally, but advantage should be taken of good seed years, and the humus should be raked into piles often or the soil treated by harrowing, plowing, grazing swine, etc. In the preparation cuttings, protection of the stand against too great opening is more important than removal of forked and other undesirable trees. [See Bot. Absts. 9, Entry 187 and following entry.]—*J. Roeser.*

1649. MÜLLER. **Forstliche Mitteilungen aus dem preussischen Solling.** [Forest information from the Prussian Solling.] Zeitschr. Forst- u. Jagdw. 51: 301–307. 1919.—The present method of establishing oak in the beech forests of Prussian Solling, selected after much experimenting, is by dibbling under beech stands at the time of the regeneration cutting or during beech seed years. The previously used Martzfeld method proved too expensive. The oak is allowed to start up with the beech reproduction, which prevents its destruction by game (a serious menace to oak reproduction in this region), and advance beech saplings are cut down to avoid interference with the oak. Wherever dominant oaks are found in the Solling in equal-aged mixture with beech, 2 facts are evident: The site is sunny and the species is *Quercus sessiliflora*. On cool, shaded sites the oak is always suppressed. *Q. sessiliflora* succeeds better than *Q. pedunculata* since it has a shallow root system, thrives in shallow soil, and mixes better with beech. Planting in rows or groups is preferable to single planting because (1) oak is for sentimental reasons favored in cutting, contrary to the best economic interests, and (2) when the stand is opened the trees develop trunk sprouts and invariably become stag-headed.—*J. Roeser.*

1650. NELSON, J. C. **Deam's trees of Indiana (revised edition).** [Rev. of: DEAM, CHAS. C. **The trees of Indiana. First revised edition.** Dept. Conservation Indiana Publ. 13. *317 p., 134 pl.* 1921.] Rhodora 23: 179. 1921.—This is a brief account of the most noteworthy changes which have been made in the revision.—*James P. Poole.*

1651. OERTZEN, VON. **Erfahrungen aus dem Walde.** [Experiences from the forest.] Zeitschr. Forst- u. Jagdw. 51: 39–41. 1919.—The author discusses the habits and value of blueberry (*Vaccinium myrtillus*) and of heather, and the factors entering into hardpan formation.—*J. Roeser.*

1652. Oliver, G. D. **History of Sierra Nevada lumbering industry.** Intercoll. Forest. Club Ann. 1: 30–34. 1921.

1653. Pearson, R. S. **Note on the contraction of sal (Shorea robusta) timber while seasoning.** Indian Forest. 47: 245–247. *1 chart.* 1921.—A section of green sal plank 1 inch thick and 12 inches wide contracted 0.455 inches in width, the rate being fairly uniform and following the moisture content of the wood. During times of high humidity the plank expanded slightly.—*E. N. Munns.*

1654. Quairière, C. J. **L'arboretum de Gedinne. [The arboretum of Gedinne, Belgium.]** Bull. Soc. Centrale Forest. Belgique 24: 19–31. 1921.—The 2 genera *Abies* and *Picea* are classified by species according to their reaction to the locality at Gedinne. Of the exotics the species of *Abies* which made very good growth are *A. grandis, A. balsamea, A. fraseri, A. concolor, A. Veitchi, A. pectinata*; of *Picea* the species which made good growth are *P. Sitchensis, P. omorika, P. bicolor.* Other species of both genera fall into 2 lower classifications. The account is to be continued.—*W. C. Lowdermilk.*

1655. R., E. **Faut-il exploiter les pineraies ravagées par la nonne et la noctuelle du pin? [Is it necessary to cut the pineries damaged by pine defoliators?]** Bull. Soc. Centrale Forest. Belgique 23: 405–408. 1920.

1656. Recknagel, A. B. **Is forestry succeeding?** Intercoll. Forest. Club Ann. 1: 11–12. 1921.

1657. Rindl, M. **Some sources of non-drying oils.** South African Jour. Indust. 4: 641–649. 1921.—The Bulletin of the Imperial Institute has published investigations of the oil from *Balanites Mangnamii,* which abounds in Portuguese East Africa. The oil is said to equal in value refined cotton seed oil.—The seed of *Calodendron capense* yields a pale yellow oil, which would be suitable for soap making.—The seed of the baobab tree, *Adamsonia digitata,* yield too little oil to render them commercially valuable. The oil from the Marula nut, *Sclerocarya caffra,* would be suitable for soap manufacture and possibly for edible purposes, but the low percentage of kernel in the fruit and the difficulty of cracking the nuts and separating the kernels makes it unlikely that it will become commercially valuable. The Cashew tree, *Anacardium occidentale,* flourishes in Portuguese East Africa and should grow well in the more tropical districts of the Union. In view of its value as a substitute for almonds the cultivation of the Cashew nut holds considerable prospect of success. Oils derived from *Ximenia americana, X. caffra,* and *Telfairia pedata* are also discussed.—*E. M. Doidge.*

1658. Roessler. **Das rheinische Wirtschaftsbuch als Teil des Betriebswerkes und der Betriebskontrollen. [The Rhenish control book as a part of the management plan and the management control.]** Zeitschr. Forst- u. Jagdw. 51: 436–438. 1919.—The usual valuation books, special cards, control books, etc., are not suited for use in the woods. The author presents the outline of a management book copied, with minor improvements, from that of the Rhenish communal forest administration, and recommends it to all forest managers—*J. Roeser.*

1659. Schnaase. **Die formelle Behandlung der Betriebsregulierungen nach dem Kriege. [The formal treatment of forest working plans after the war.]** Zeitschr. Forst- u. Jagdw. 51: 98–103. 1919.—It is conservatively estimated that ½ of all Prussian forest districts are in need of new working plans, as post-war conditions make the preparation of plans under the old instructions impossible. Therefore, temporary plans should be prepared to insure a continued wood supply during the 1st period (approximately 20 years). Suggestions as to ways and means of formulating and carrying out this work are included.—*J. Roeser.*

1660. Schröder, H. **Bodenrückgang unter Fichte. [Soil retrogression under Norway spruce.]** Zeitschr. Forst- u. Jagdw. 51: 439–444. 1919.—The author investigated 2 small areas planted to Norway spruce in 1840–1845 and since cleared. These were located on the

east coast of north Sleswick in a broad-leaf forest composed chiefly of beech. The terrain was rolling and the soil a fresh, slightly sandy loam. In both areas the spruce has changed the soil, through the influence of a mossy covering, especially *Polytrichum*, into a decided hard pan in 65–70 years. This effect was most pronounced in the center of the spruce stand and disappeared under the surrounding beech. According to the author it is caused by the formation of raw humus under the heavy spruce cover and the leaching of the soil by humic acid. The present tendency to convert poorly reproducing beech stands into spruce should therefore be critically considered.—*J. Roeser.*

1661. SCHUBERT, JOH. **Ertrag eines Normalwaldes.** [Yield of a normal forest.] Zeitschr. Forst- u. Jagdw. 51: 260–265. *Fig. 1–2.* 1919.—The author discusses forest, soil, and total net yields in normal stands of Norway spruce, on the basis of yield tables by Schwappach. Representing the net forest revenue (r) as a function of the rotation (u), and a slight increase in period of rotation as Δu and the corresponding change of r as Δr, the net forest revenue reaches its highest value when $\frac{\Delta r}{\Delta u}$ equals zero, which is with a rotation of 113 years. The author concludes that the rotation u_b yielding the greatest soil revenue is expressed by the formula $\frac{\Delta r}{\Delta N} = \frac{p}{100}$, where N represents the normal supply. At the following rates of interest, 1, 1.5, 2.0, 2.5, 3.0, 3.5, and 4.0 per cent, the rotation is respectively 92, 81, 74, 69, 65, 61, and 58 years. The total net revenue culminates in a higher rotation than the soil net revenue.—The average increase in lumber prices in the Prussian state forests during the period 1833–1912 approached 1.5 per cent annually.—*J. Roeser.*

1662. SCHWAPPACH. **Neuere Untersuchungen über dem Wachstumsgang der Schwarzerlen-Bestände.** [Investigations of growth rate of black alder [Alnus glutinosa Gaert.] stands.] Zeitschr. Forst- u. Jagdw. 51: 184–190. 1919.—A comparison of results of investigations in 1918 with results of a single observation in 1902 shows: (1) The total increment of black alder stands is only a little higher in 1918, and the difference occurs in the period following the 40th year; (2) 40–45 per cent, instead of 30 per cent, of the total increment is removed in thinning; (3) the current annual increment and the average annual increment attain a maximum in comparatively late years, the former at approximately 45, the latter at 70 years. In general, coppice can no longer be considered suited to black alder. A normal yield table for black alder is included.—*J. Roeser.*

1663. SEELEN, VON. **Der Wald als Bruder des Feldes.** [The forest as brother of the farm.] Zeitschr. Forst- u. Jagdw. 51: 308–315. 1919.—This article is a humorous rebuttal of forester Mertens' opinion that certain forest rights-of-users (Waldgrundgerechtigkeiten) should be discontinued. Mertens would place the collection of dry, fallen wood under a permit system, but Seelen argues that this would result in petty trespass. The former also favors the establishment of permanent forest pastures in preference to the use of forests for grazing; but even if only ½ of Germany's cattle were grazed in such pastures, approximately 2,000,000 hectares of the best forest soil would have to be set aside, which would be a great economic mistake. Although the results of rights of pannage (Mastnutzung) have not been successful, this practice should be given a thorough test.—*J. Roeser.*

1664. SEVERIN, G. **Un insecte nuisible au chêne.** [An insect injurious to oak.] Bull. Soc. Centrale Forest. Belgique 23: 270–279. *Fig. 1–11.* 1920.—*Kermes quercus* (L.) CKLL or *K. reniformis* (Fourcr.) Sign. was found to be the insect causing damage to woods in the Meuse and Sambre valley. The life history of the insect is given. A bibliography is added.—*W. C. Lowdermilk.*

1665. SEVERIN, G. **Un insecte nuisible au chêne.** [An insect injurious to oak.] Bull. Soc. Centrale Forest. Belgique 23: 314–323. *Fig. 12–21.* 1920.—The life histories of Coccinidae are continued and an account of *Lecanium* and *Kermes quercus* is included.—*W. C. Lowdermilk.*

1666. Severin, G. **Un insecte nuisible au chêne. [An insect injurious to oak.]** Bull. Soc. Centrale Forest. Belgique 23: 367–376, 408–415. *Fig. 22–23.* 1920.—The economic aspects of the damage done by *Kermes quercus* is discussed. Several methods of combating the insect are given, but none holds out much promise. The insect being little known, there is some confusion regarding classification. The author feels justified in retaining the name *Kermes quercus*.—*W. C. Lowdermilk.*

1667. Siecke, E. O., and L. Wyman. **Tree planting by farmers for fuel, fence posts and shelter.** Texas Agric. Exp. Sta. Forest. Bull. 13. *24 p., 10 fig.* 1920.—The treeless area of the state is the Panhandle, west Texas, below the caprock, and the Trans-Pecos country. This was the cattle country but dry farming has replaced cattle raising. Protection from sand storms and drying winds may be partially secured by planting trees, about 6 rows making an effective windbreak. The scarcity of fuel and fence posts makes a grove of trees desirable on every farm in this area. The species suited to different localities, the question of seedlings and transplanted stocks, renewals of windbreaks and woodlots, spacing, cultivation, and cost are briefly discussed.—*L. Pace.*

1668. Sim, T. R. **Tree planting for the farm II.** South African Jour. Indust. 4: 472–478. 1921.—In this installment directions are given for preparation of the land, raising of seed, planting out, and sowing in situ.—*E. M. Doidge.*

1669. Sim, T. R. **Tree-planting for the farm III.** South African Jour. Indust. 4: 554–562, 666–672. 1921.—The financial aspect of tree-planting is considered, and directions given for cultivation and thinning. Trees suitable for planting in various districts are listed, and the merits of various species for commercial planting are discussed.—*E. M. Doidge.*

1670. Warner, H. H. **The size of yew trees.** Garden 85: 156, 205. *Illus.* 1921.—This contains 2 notes on venerable trees and their dimensions, data for the 1st being taken largely from The Yew Trees of Great Britain and Ireland, by Dr. John Lowe, The 2nd gives some additions and corrections of measurements and an illustration of the yew by Iffley Church near Oxford. This, according to tradition, is as old as the church, which was built in 1175.—*M. F. Warner.*

GENETICS

George H. Shull, *Editor*
J. P. Kelly, *Assistant Editor*

(See also in this issue Entries 1448, 1463, 1477, 1478, 1479, 1480, 1488, 1515, 1523, 1545, 1642, 1753, 1757, 1762, 1776, 1787, 1789, 1790, 1822, 1839, 1918, 1963, 2047)

1671. Anonymous. **Increasing yields by bud selection.** Agric. Gaz. New South Wales 32: 698. 1921.—This consists essentially of quotations from an article by E. B. Babcock of California, warning against too much optimism in bud selection in deciduous fruits.—*L. R. Waldron.*

1672. Anonymous. **Measuring intelligence.** Jour. Heredity 11: 86–87. *1 fig.* 1920.—This is a report of the findings of the Committee on Army Mental Tests of the American Psychological Association and National Research Council. Test ratings furnished a fairly reliable index to ability to learn, think quickly and accurately, analyze a situation, maintain a state of mental alertness, comprehend and follow instructions. Test score was little affected by schooling. There was no proof that men of equal mental rating were of equal military worth. Temperamental qualities could not be measured, yet a superior degree of loyalty, bravery, and leadership was more often correlated with superior intelligence than otherwise. Intelligence rating was found to be one of the most important aids in selecting men for specialized tasks, and corresponded closely to pre-army occupational levels, i.e.: (1) Lowest

nental test ratings were made by unskilled and semi-skilled laborers capable of routine work as privates; (2) many skilled laborers and clerical workers showed capacity to serve as non-commissioned officers; (3) semi-professionals made up a large percentage of the commissioned officers; (4) professional men of highest intellectual type furnished the most superior officer material.—*M. C. Gould.*

1673. Anonymous. **The heredity and environment of a great botanist.** Jour. Heredity 11: 3. 1920.—This article gives the writer's impressions on reading Leonard Huxley's Life and Letters, by Sir Joseph Dalton Hooker.—*Merle C. Coulter.*

1674. Anonymous. **Variation in scarlet runner beans.** Gard. Chron. 69: 176. 1921.—I. de Vilmorin displayed before the French National Horticultural Society a series of seed-color variations in beans from natural crosses between scarlet runner, *Phaseolus multiflorus,* and a black-seeded form of the same species. By the 2nd year 10 new colors had appeared. "Most of the possible combinations between the colors, 'wine-color,' black, gray, and maroon, were displayed, in many different kinds of marbling, varying in intensity and extent." No attempt was made to analyze the phenomena from the Mendelian standpoint. Comparison is made of the anthocyanin content of these beans.—*L. R. Waldron.*

1675. Anonymous. **Deficiency in intellect found to be correlated with deficiency in the number of brain cells.** [Rev. of: Ellis, Robert S. **A preliminary study of the Purkinje cells in normal, subnormal, and senescent human cerebella, with some notes on functional localization.** Jour. Comparative Neurol. 30: No. 2. Feb. 1919.] Jour. Heredity 10: 369. 1919.—Examination of a number of cerebella showed that the number of Purkinje cells varies under different conditions. In cases of paresis, extreme old age, and idiocy, the number of Purkinje cells is reduced by disintegration, and there is deficiency in motor coordination. This raises the question as to the extent to which differences in percentage of cells may be the anatomical basis for mental defect. The author contends that all such cases are due to some form of antenatal degeneration.—*M. C. Gould.*

1676. Allen, W. J. **Gravenstein grafts at Bathurst.** Agric. Gaz. New South Wales 32: 511. 1921.—Evidence goes to show that the stock exerts an effect upon the scion, resulting in a "twisting" effect which is absent in the tree from which the scions were taken.—*L. R. Waldron.*

1677. Bataillon, Charles. **Spermies couplées et hétérochromosome dans la lignée typique d'une Turritelle.** [**Paired sperms and heterochromosome in the typical line of a Turritella.**] Compt. Rend. Soc. Biol. 84: 219–222. *1 fig.* 1921.—Spermatozoa of *Turritella communis* are found in pairs more or less closely united throughout their length. This rare phenomenon was observed in the Opossum by Selenka and in Dytiscidae by Ballowitz, but its origin was studied only superficially or not at all. In *Turritella* it has its origin in maturation. The 2nd maturation division results in 2 distinct cells, which later fuse into practically a binucleate cell. Development of the pair has been traced through all stages to adult spermatozoa. Presumably they separate at or before fertilization, but this has not been proved. The 1st maturation division is unequal, 1 secondary spermatocyte receiving a larger chromosome than the other. From each secondary spermatocyte comes 1 pair of spermatozoa, hence these pairs are of 2 kinds. If heterochromosomes of the 1st division are X and Y, some pairs are male-producing, others female-producing.—*A. Franklin Shull.*

1678. Bateson, W. **Root-cuttings and chimeras. II.** Jour. Genetics 11: 91–97. *Pl. 13–14.* 1921.—The author reports the occurrence of a red double-flowered Bouvardia from root cuttings of the double pinkish white Bridesmaid variety, also of a single-flowered form from root cuttings of the new double red variety, and lists 12 varieties whose progeny from root cuttings were exactly alike. Other anomalies in flower and foliage color arising from root cuttings are noted.—Three sports arising from root sprouts of cuttings of fancy named varieties of *Pelargonium* are described, and differences between "type" and "sport" foliage and

flowers in the "Golden Flame" variety of *P. zonale* are treated in detail. The inclusion of cells belonging to one form within tissues of the other is especially noted.—A variegated form of *Spirea Ulmaria* devoid of functional germ cells resembles the totally sterile "Freak of Nature" zonal Pelargonium described earlier. This shows that, although varieties producing new forms from root cuttings may be regarded as periclinal chimeras, other possibilities must be remembered. Many herbaceous variegated plants arranged periclinally may give shoots composed entirely of either internal or external constituents. These are not always endogenous, but may be originated by a periclinal division in the cortical layers. Attempts to breed root cuttings with parent plants have been unsuccessful.—*E. B. Babcock.*

1679. Berry, Reginald Arthur, and Daniel Grant O'Brien. **Errors in feeding experiments with cross-bred pigs.** Jour. Agric. Sci. 11: 275–286. *2 fig.* 1921.—In experiments in feeding two lots of pigs, one of 43, and another of 46, each for 16 weeks, conditions were so nearly comparable that combining results of the 2 trials was permissible for statistical purposes, as proved by mathematical test. The probable error in rate of gain for 1 pig, in terms of average daily gain, was 7 per cent; for pure-bred pigs of the same litter and of similar live weight, 3 per cent; and for cross-bred pigs of similar weight but of different parents, 4 per cent. The error, greatest for a short feeding period, decreases rapidly week by week up to 7 weeks, after which the rate of decrease is slow. The errors on 18 separate pens of 4 pigs each varied from 2.3 to 12.08 per cent, averaging 6.21 per cent. An increased daily rate of gain decreases the probable error; the converse is also true. The rate of gain in female pigs was depressed slightly by a period of heat, but the difference between gilts and barrows was only 0.02 pounds. The stage of fattening did not affect the error, although well-fattened animals showed a greater range in rate of gain than those only partially fattened.—*Edward N. Wentworth.*

1680. Blakeslee, Albert F. **Mutations in mucors.** Jour. Heredity 11: 278–284. *3 fig.* 1920.—In the examination of about 38,000 progeny of single asexual spores from cultures of the hermaphrodite mould, *Mucor genevensis*, many variant forms were seen. In the subsequent asexual generations of most of these forms the normal strain appeared and gradually predominated to the exclusion of the variant. However, 2 of these mutants have been shown to be stable, at least for many generations. The "Dwarf" mutant lacks asexual spores and also zygospores, and has been grown unchanged for nearly 7 years. Mutant "A" lacks hermaphrodite zygospores, has a strong minus sexual reaction, and only a feeble plus one. This form has been grown for 16 generations and appears stable. Among the inconstant mutants, "X," a hermaphrodite with a plus tendency, had low white growth and large zygospores; in the course of years its cultures reverted to the normal type. Mutant "D," which had a yellowish dense growth and was almost without zygospores, had a minus tendency, and seems to have finally reverted. The "Yeast" mutant was composed of separate cells in its early stage of growth. In the course of time only normal forms were found among the progeny.—*John Belling.*

1681. Blaringhem, L. **A propos de l'hérédité des fascies de Capsella Viguieri. [Concerning the heredity of fasciations in Capsella Viguieri.]** Compt. Rend. Acad. Sci. Paris 169: 298–300. 1919.—This unique plant, named and described by the author in 1910, is claimed to be the best known example of the sudden birth of a new species. For 12 generations the tendency to produce fasciated stems has been maintained as a constant character. The only other true-breeding fasciated species known is cock's-comb, *Celosia cristata* L. In both species the fasciated character is amplified by cultural conditions favoring vegetative development, i.e., by transplanting to rich soil under glass. De Vries has pointed out an apparent relation between fasciation and tricotyledony in *Amaranthus retroflexus*, but in *Capsella Viguieri* the author observed but 4 tricotyls among 3000 seedlings examined.—*Merle C. Coulter.*

1682. Bliss, A. J. **Unusual forms of Iris flowers.** Gard. Chron. 70: 149. 1921.—Of abnormal flower forms the tetramerous occurs most frequently among the author's seedlings

and is coupled generally with vigor of growth, though many of the most vigorous seedlings have never produced abnormal flowers. It is suggested that these forms may partake of the nature of peloria and that the tendency to produce tetramerous flowers is heritable, despite the fact that such flowers may appear on one spike and not on adjacent ones, or during one season and not another, showing that something additional is necessary for their occurrence.—*J. Marion Shull.*

1683. BOULENGER, E. G. **Experiments on colour-changes of the spotted salamander (Salamandra maculosa), conducted in the Society's gardens.** Proc. Zool. Soc. London 1921: 99–102. *2 pl., 1 fig.* 1921.—In undertaking to repeat some of Kammerer's experiments on the action of changed environment on certain amphibians, the author separated 32 new-born young from a single *Salamandra maculosa* var. *taeniata* in 2 lots, one in an aquarium painted yellow on the bottom and sides, the other in a corresponding aquarium painted black. At transformation, Sacerov's results were confirmed, i.e., those reared on the yellow background were "yellower than the mother, and the spots larger and fused together," those on the black being "darker than the mother and the spots smaller and more numerous." The author, however, has no doubt that these 2 types will in time assume the same character.—*A. M. Banta.*

1684. BOWMAN, H. H. M. **Deterioration in some horticultural varieties through deficient artificial selection.** Jour. Heredity 11: 380–383. 1920.—In the spring of 1919 seeds were purchased of named varieties of China aster, *Callistephus chinensis*, *Zinnia elegans*, African marigold (*Tagetes erecta*), *Matthiola incana*, and the corn-flower (*Centaurea cyanus*). These varieties (purchased from the same firm) had been grown in the 2 preceding years under similar conditions. In all cases notable variations were observed which in most cases are considered as deteriorations from the standard. The author believes that there has been much mixing with dominant inferior strains, which has naturally affected the germ plasm of the standard varieties, and that therefore these variations are due to genetic rather than environmental causes.—*C. E. Myers.*

1685. BRIDGES, CALVIN B. **Triploid intersexes in Drosophila melanogaster.** Science 54: 252–254. 1921.—A culture of flies produced 96 females, 9 males, and about 80 individuals "intermediate between males and females." Distribution of the genetic characters brown, plexus, and speck, in this culture was so aberrant as to warrant the hypothesis that the chromosomes involved might sometimes be present in a triploid instead of the usual diploid number. This was confirmed by cytological evidence. The intersexes, which were all sterile, each had 3 second chromosomes, 3 third chromosomes, 2 X-chromosomes, 2 or 3 fourth chromosomes, and either with or without a Y-chromosome. The author, describing the appearance and genetic behavior of various flies of this aberrant group, says: "A significant new conclusion proved by the intersexes is that sex in *D. melanogaster* is determined by a balance between the genes contained in the X-chromosome and those contained in the autosomes. . . . . The ratio of *2X : 2 sets autosomes*, or *3X : 3 sets autosomes* (or *1X : 1 set autosomes?*) produces a female, while *1X : 2 sets autosomes* produces a male. An intermediate ratio, *2X : 3 sets autosomes*, produces an intermediate condition,—the intersex." After discussing the possibilities already found, the author comments on the varying influence of autosomes, and speculates on the effect of additional chromosome ratios.—*John S. Dexter.*

1686. BROILI, J. **Der Pollenstab.** [The pollen staff.] Deutsch. Landw. Presse 1920: 447–448. *1 fig.* 1920.—The author describes a stick to be inserted into the ground to facilitate collection of pollen in vials. It is especially convenient in potato work. [From anonymous review in Zeitschr. Pflanzenzücht. 8: 45–46. 1921.]—*J. P. Kelly.*

1687. BROOKS, F. T. **The inheritance of disease-resistance in plants.** Trans. British Mycol. Soc. 7: 71–78. 1921.—The hitherto unpublished results of Armstrong's work with yellow rust of wheat (*Puccinia glumarum* form. *tritici*), are outlined. All F_1 plants of Wilhelmina × American Club were moderately rusted. The F_2 generation, sown partly in autumn and partly in spring, contained 1560 plants, of which 381 were badly rusted, 832 moder-

ately so, and 347 were rust-free,—approximately a 1:2:1 ratio. The genotypes of some of the F_2 plants were tested by growing the F_3 plants. Taking the whole F_2 crop after adjustment with the F_3 results, the following composition was indicated: 392 homozygous susceptible, 797 heterozygous susceptible, and 371 homozygous immune. Different behavior in different years is attributed to the operation of environmental factors.—Armstrong's preliminary studies with wheat indicate that resistance to mildew (*Erysiphe graminis*) behaves as a Mendelian dominant.—*A. N. Wilcox.*

1688. Brumpt, E. **Recherches sur le déterminisme des sexes et de l'évolution des Anguillules parasites (Strongyloides). [Studies on the determinism of sex and the evolution of the parasitic Anguillula (Strongyloides).]** Compt. Rend. Soc. Biol. 85: 149–152. 1921.—*Strongyloides papillosus*, parasitic in the small intestine of sheep, exists in a parthenogenetic parasitic generation and a free-living bisexual generation. Eggs laid by the parasitic form pass with the feces and produce rhabditic larvae, of which some develop directly into strongyloid larvae ready to infect a new host, some into males and females. The bisexual generation is mostly sterile because of rarity of males. Cultures usually contain 1 male to 1000–2000 females, rarely a much higher proportion. The proportion of directly developing strongyloid larvae and of adult males varies; in many cultures development is exclusively direct, most others show 95–98 per cent direct development, and a few show as high as 90 per cent indirect development (males or females).—From the feces of young infected rabbits there were recovered 237 males, 409 females, 1236 direct larvae, and later many larvae of indirect cycle coming from fertilized females. The higher proportion of indirect development and of males in rabbits than in sheep is attributed to the physico-chemical character of the intestinal mucus. A strongyloid infectious larva from a parthenogenetic parent will, if reared in a rabbit, yield a parthenogenetic animal whose eggs produce 1000–2000 times as many males as if the strongyloid larva had been reared in a sheep.—*A. Franklin Shull.*

1689. Castle, W. E. **An improved method of estimating the number of genetic factors concerned in cases of blending inheritance.** Science 54: 223. 1921.—A modified formula for estimating the number of genetic factors (n) concerned in cases of blending inheritance (see following entry) suggested by Wright is $n = \frac{D^2}{8\sigma_2^2 - \sigma_1^2}$, in which D is the difference between the means of the parental races, σ_1 the standard deviation of the F_1, and σ_2 the standard deviation of F_2.—*D. F. Jones.*

1690. Castle, W. E. **On a method of estimating the number of genetic factors concerned in cases of blending inheritance.** Science 54: 93–96. 1921.—The amount of variability of F_2 over F_1, shown by the standard deviation, divided by the difference of the 2 parental means is taken as a comparative measure of the number of factor differences concerned in cases of blending inheritance. Applied to data for seed weight of maize, it gives from 11 to 19 as the number of genetic factors involved. In a cross of Polish × Himalayan rabbits 50 or more factors were calculated as governing body size. Serious limitations as to the applicability of this method are recognized, viz., it applies perfectly only to cases in which the parents are genetically pure, and does not allow for unequal effect of different factors.—*D. F. Jones.*

1691. Castle, W. E., and W. L. Wachter. **Genetics of Hereford cattle.** Jour. Heredity 12: 37–39. *Fig. 27–28.* 1921.—This is a criticism of a paper by Frances Pitt (see Bot. Absts. 5, Entry 1605), in which an attempt was made to account for variations in the coat pattern and intensity of color of Hereford cattle on the basis of 5 Mendelian factors. The present authors hold that the data are insufficient to demonstrate the unit nature of these factors.—*Sewall Wright.*

1692. Clausen, R. E., and T. H. Goodspeed. **Inheritance in Nicotiana Tabacum. II. On the existence of genetically distinct red-flowering varieties.** Amer. Nat. 55: 328–334. 1921.—In studies of inheritance in *Nicotiana Tabacum* the following formulae were suggested for 4 flower colors: *WW RR PP*, carmine; *WW RR pp*, light pink; *WW rr pp*, red; and *ww*

RR pp, white. *WW RR PP* represents the basic type, carmine in color; *w*, the difference from it which gives white, irrespective of which members of the pair occupy the *R* or *P* loci; *p*, that which gives pink; and *r*, that which changes pink to red.—In reciprocal crosses between Cuba (white) and *macrophylla* (red), 150 F_1 plants were pink-flowered. The F_2 plants gave totals of 113 pink, 44 red, and 42 white, the expected numbers, based on a 9: 3: 4 ratio, being 112 : 37: 50. Another form, *purpurea*, exhibits a flower color somewhat darker and more intense than *macrophylla*. In order to demonstrate the difference in behavior between these 2 reds, a number of parallel crosses were made between them and other *Tabacum* varieties. When *macrophylla* was crossed with *angustifolia* (light pink), with Cavala (pinkish), and with Cuba (white), all the F_1 plants were pink-flowered. When *purpurea* was crossed with these 3 forms, the F_1 plants were carmine-flowered. Further crosses of Cuba and *purpurea* gave F_2 totals of 190 carmine, 48 pink, 107 white, further substantiating the difference between *macrophylla* and *purpurea*. This also supports the belief that the dominant carmine described by Allard was genetically different from the recessive red previously described by the authors.—*A. N. Wilcox.*

1693. Collins, J. L. **The new craft of making plants to order.** Gard. Mag. 33: 372–374. *2 fig.* 1921.—This is a rather non-technical review of the method of producing new plants by applying genetic principles.—*H. E. Brewbaker.*

1694. Collins, J. L. **The new craft of making plants to order. II. Increased crop through hybrid seed.** Gard. Mag. 34: 40–41. *3 fig.* 1921.—Commercial possibilities are pointed out. —*H. E. Brewbaker.*

1695. Coville, Frederick V. **A new hybrid—the Katherine blueberry.** Jour. Heredity 11: *Frontispiece.* 1920.—This is the best of 3,000 hybrids from crossing 2 selected strains of highbush blueberry. Over 97 per cent of the berries range between ½ and ¾ inch in diameter; and they have a delicious flavor, firm texture, and small seeds. This variety will soon be on the market.—*Merle C. Coulter.*

1696. Daniel, Lucien. **Recherches sur la greffe des Solanum. [Studies on Solanum grafts.]** Compt. Rend. Acad. Sci. Paris 171: 1074–1076. 1920.—Potato grafts of the variety Fluke placed upon tomato and egg-plant produced aerial tubers. The aerial tubers from the potato-tomato graft produced plants which were all alike and resembled the variety Fluke. The aerial tubers from the potato-egg-plant graft produced plants which behaved as intermediates, and matured much later than the potato-tomato grafts. Three plants produced both aerial and subterranean tubers, as many of the latter being obtained as from normal plants. The plants producing both subterranean and aerial tubers were not attacked by *Phytophtora infestans*. Several grafts of egg-plant upon tomato produced fruits of tomato shape, but with the color of the egg-plant. Other grafts showed no change.—*H. K. Hayes.*

1697. Davis, H. P. **Were the black-and-white Holsteins originally red-and white?** Jour. Heredity 11: 155. 1920.—The author reports the occurrence of a Holstein calf with red-and-white markings, which leads him to believe that the ancestors of Holstein-Friesians were probably red-and-white. He desires information concerning this problem and contact with anyone having a red-and-white heifer.—*E. Roberts.*

1698. Detlefsen, J. A. **A herd of albino cattle.** Jour. Heredity 11: 378–379. *Fig. 26–27.* 1920.—The author describes a herd of pink-eyed white cattle at Mora, Minnesota. The owners' statements as to the mode of origin and later breeding do not harmonize well with any simple explanation of the mode of inheritance of albinism, and agree best with the hypothesis that it is recessive. The original albinos are said to have come from mating a Holstein bull to grade Holstein cows.—*Sewall Wright.*

1699. Dunn, L. C. **Unit character variation in rodents.** Jour. Mammalogy 2: 125–140. 1921.—Comparison is made between color variations studied experimentally in rodents

and those reported as occurring in the wild, or represented by specimens in various museums. White spotting, albinism, yellow, black, and the pink-eyed colored variation are found to be rather widely distributed mutations from the agouti color, typical of wild rodents. Community of genes, which seems probable in many cases, has been proved by similarity in linkage relations in the case of the pink-eyed colored variation and albinism in rats and mice.—*Sewall Wright.*

1700. Euler, K. **Ein bemerkenswerter Fall von Knollenfarbabänderung der Kartoffel. [A remarkable case of change of color in potato tubers.]** Deutsch. Landw. Presse 1919: 161–162. 1919.—This is an account of a single plant (grown from a white tuber) which gave 10 red tubers and 1 tuber red at stem end and white at crown end. The tuber producing this plant was the only one from a plant whose aerial parts were killed by cold, and the variation is therefore supposed to have been induced by frost. [From anonymous review in Zeitschr. Pflanzenzücht. 7: 35. 1919.]—*J. P. Kelly.*

1701. Eyster, Lewis A. **Heritable characters of maize. VII. Male sterile.** Jour. Heredity 12: 138–141. *Fig. 21–23.* 1921.—A description and a photograph of the male-sterile character in maize, together with some genetic data on its inheritance, are presented. Defective anthers in which no pollen is produced are borne on an otherwise normal plant. Data from 2 heterozygous, self-pollinated ears and 3 back-crosses show that male-sterile is inherited as a simple Mendelian recessive to the normal type of tassel.—*E. W. Lindstrom.*

1702. Eyster, William H. **Heritable characters of maize. VI. Zigzag culms.** Jour. Heredity 11: 349–357. *Fig. 8–16.* 1920.—The zigzag culm described was first noted by R. A. Emerson in F_4 cultures of a cross between Tom Thumb and a Missouri dent corn. Emerson found that plants selfed bred true for this character and, when crossed with normal plants, produced apparently normal F_1 plants. The zigzag culm appears about the time of tassel emergence, the 1st indication being an apparent flattening and broadening of the culm in the ear-shoot region caused by the leaf sheaths pulling away from the culm. Extracted recessives from crosses vary considerably in the expression of this character. F_2 progenies of outcrosses with normal plants in segregating deviate but slightly from the 15 : 1 ratio expected when 2 duplicate factors are involved in the expression of a character. Results of back-crosses of F_1 plants with the zigzag parental type indicate that zigzag culm is expressed only when at least 2 factors are recessive.—*H. M. Steece.*

1703. Freckmann, W. **Ein Beitrag zur Frage der Futterpflanzenzüchtung. [A contribution to the question of forage-plant breeding.]** Mitteil. Deutsch. Landw. Ges. 36: 550–553. *4 fig.* 1921.—A brief account is given of some work done at Moorland experiment station, Neuhammerstein, with *Poa pratensis*, timothy, and tall meadow oat grass. The author considers that of the 3 methods used at the station, namely, general improvement, group selection, and individual selection, group selection gives the most rapid results for practical work. Pasture and meadow forms of *Poa pratensis* have been isolated, and some variations in the structure of the panicle are described. A table of analyses is given to show that strains of timothy having higher protein content can be developed. A tall, sturdy, late-maturing oat-grass, obtained by selection, is illustrated.—*A. J. Pieters.*

1704. Gassner, G. **Untersuchungen über die Sortenempfänglichkeit von Getreidepflanzen gegen Rostpilze. [Studies on the susceptibility of cereal varieties to rust.]** Zentralbl. Bakt. II Abt. 49: 7–9, 185–243. 1919.—In studying the reaction of various cereals to *Puccinia graminis*, *P. triticina*, *P. coronifera*, and *P. Maydis*, 8 grades of rust attack were distinguished; stages of development of the hosts from young seedlings to mature plants were likewise recognized. Observations were made in Uruguay (1907–10) on pure lines of small grains obtained from Germany and in South America. In both barley and wheat the stage of development of the host is particularly important in its reaction to *P. graminis*. To *P. graminis* barley varieties showed no true resistance; a German variety of oats, Beseler II, was very resistant, while a Uruguay variety proved susceptible; other European oats, among them Svalöf's

Ligowa and Gold Rain, proved highly resistant. Uruguay oat varieties were somewhat resistant to *P. coronifera*, European varieties being susceptible. At the same stage of development spring wheats proved more susceptible to *P. triticina* than winter wheats. At the same stage of development maize varieties differed in susceptibility to *P. Maydis*, early-maturing varieties being more severely attacked than later maturing ones. The author reviews various theories regarding environmental and hereditary factors which cause differences of reaction of varieties to parasitic fungi.—*H. K. Hayes.*

1705. [GATES, R. R.] [Rev. of: STURTEVANT, A. H. **The North American species of Drosophila.** Carnegie Inst. Washington. Publ. 301. *iv+150 p., 3 pl.* 1921.] Nature 107: 743. 1921.

1706. GOLDSCHMIDT, RICHARD. **Erblichkeitsstudien an Schmetterlingen. III. Der Melanismus der Nonne, Lymantria monacha L. [Genetical studies on butterflies. III. The melanism of the nun, Lymantria monacha L.]** Zeitschr. Indukt. Abstamm.- u. Vererb. 25: 89–163. *Pl. 6–8, 2 fig.* 1921.—Melanism in the nun moth presents in each sex an unbroken series of variations from white to black, and depends upon the recombination of 3 pairs of factors, 1 sex-linked. Males are darker than females. Polymeric and sex-linked factors cooperate, as in fertility in fowls (Pearl) and the silky fowl × brown leghorn (Bateson, Punnett).—All 3 factors are dominant: *A*, responsible for faint pigmentation in near-white individuals, but not yet fully analysed; *B*, spreading an increased pigmentation from the middle band of the wing; *C*, a sex-linked darkening factor for which the female is always heterozygous, much more intense in action than *B*, which it supplements.—Six forms of ♀ and 9 of ♂ result from *B* and (*CX*), all visibly distinct except a few male combinations. Of the theoretical 54 cross-combinations, 28 were realized, in some cases by several matings. A detailed history of successive generations in 7 different stocks is given.—The unexpected appearance in 4 cultures of individuals carrying the sex-linked factor (*CX*), although belonging to strains free from it, is interpreted as mutation. Non-disjunction of *X*-chromosome in the homozygous male explains 3 anomalous families, e.g., a fully melanic female, *BB* (*CX*), × white ♂, *bb*(*cX*) (*cX*), should give by "criss-cross" inheritance only white ♀♀ and black ♂♂, but 1 brood contained, besides 55 typical individuals, 1 dark ♀, [*Bb* (*CX*)], and 1 banded ♂, [*Bb*(*cX*) (*cX*)]. These 2 came from gametes *b*, and *b*(*cX*) (*cX*) of the father, meeting *B* (*CX*) of the mother.—Seiler reports that 28 chromosomes, including 1 remarkably large, occur in both the 1st and 2nd spermatocytic mitoses. All sperms contain this number. In the metaphase of the 1st maturation spindle of the egg, however, 31 chromosomes occur, of which 4 fuse during the anaphase. Hence the equatorial plate of the 2nd maturation spindle has only 28. But an embryo shows 62, not 56. Peculiarities of sex-linked inheritance are expected from the occurrence of a compound sex chromosome.—Melanic individuals were rare from 1785 till about 50 years ago, but now have largely replaced the type, especially near industrial centers. The theoretical statistical consequences of the appearance, within the original white population, of a certain proportion of mutants for one or both of the factors, followed by free intercrossing, are worked out, no selection value being attached to the melanic character. In general, after a single period of mutation, dark individuals tend to become more abundant than light except that, if the sex-linked (*CX*) is involved, the proportion remains constant in the female. Repeated mutations of 10 per cent annually would be necessary to insure supremacy of the dark form in 40 years. This percentage of mutation being improbable, selection-value is ascribed to the melanic form.—Numerous measurements show that dark individuals are not necessarily larger (and stronger) than the type, but artificial selection of dark individuals has resulted in a marked increase in size. Disturbed natural conditions around industrial districts may greatly increase a selection value elsewhere slight. Possibly larvae of the melanic form better withstand the ill effects of feeding upon leaves of trees covered with chemical deposits. That homozygous white males fall below expected numbers in the cultures may indicate low viability.—Melanism in the adult has no effect upon the caterpillar. Melanism in the larva is due to another independent dominant factor.—*John H. Gerould.*

1707. GOLDSCHMIDT, RICHARD. **Kleine Beobachtungen und Ideen zur Zellenlehre. II. Die Spermatogenese eines parthenogenetischen Frosches nebst Bemerkungen zur Frage welches Geschlecht bei den Amphibien das Heterozygotische ist. [Minor observations and ideas in cytology. II. The spermatogenesis of a parthenogenetic frog with comments on the question which is the heterozygous sex in amphibia.]** Arch. Zellf. 15: 283–290. 1920.—The author reports the diploid number of 26 chromosomes in the testis of an adult frog which J. Loeb produced by artificial parthenogenesis. He discusses possible explanations of this occurrence and suggests that the female is heterozygous for a sex chromosome.—*C. L. Parmenter.*

1708. GOLDSCHMIDT, RICHARD. **Zur quantitativen Auffassung multipler Allelomorphe. [Quantitative conception of multiple allelomorphs.]** Zeitschr. Indukt. Abstamm.- u. Vererb. 26: 285–287. 1 *fig.* 1921.—Muller has shown that the multiple allelomorphs for eye color in *Drosophila* can not be fitted to an ordinary probability curve, and contends that they are not quantitative variations of a single gene. The quantitative conception of multiple allelomorphs demands not that they fit a single probability curve, but several such curves overlapping each other. Muller's 2nd argument, based on the theory that the factors located on the X-chromosome produce the same effect in both sexes, is also held invalid. The effect of any 1 factor is a result of dominance rather than of quantity.—*P. C. Mangelsdorf.*

1709. GOODRICH, E. W. **Some problems in evolution.** Sci. Monthly 13: 316–321. 1921.—This address emphasizes the fundamental problem of how genetic factors of an organism originate and change. Guyer's anti-lens tests suggest that environmental influences give rise to heritable mutations. The share of mind in evolution is discussed, with the statement that mind and body evolved together.—*L. Pace.*

1710. GOWEN, JOHN W. **Inheritance in crosses of dairy and beef breeds of cattle. II. On the transmission of milk yield to the first generation.** Jour. Heredity 11: 300–316. *Fig. 5–15.* 1920.—Results of crosses among Aberdeen Angus, Holstein-Friesian, Jersey, Guernsey, and Ayrshires in relation to milk yield are discussed. One cross-bred from a Holstein-Friesian cow and a Jersey bull resembled closely the expected potential milk production of the Jersey. This is probably due to segregation of factors for low milk production rather than dominance of low production. From the other cases it appears that high milk yield is partially dominant to low milk yield, since cross-breds resemble high parents more closely in this respect than they do low parents. Other investigations on this subject are briefly reviewed.—*E. Roberts.*

1711. HAECKER, V. **Weitere phänogenetische Untersuchungen an Farbenrassen. [Further phenogenetical studies of color races.]** Zeitschr. Indukt. Abstamm.- u. Vererb. 25: 177–184. *1 pl.* 1921.—The dark races of Axolotl studied by Haecker were heterozygous. The author suggests that the varying proportions of the 2 types of pigment cells are probably due to "demoralization" of the conditions of equilibrium between the corial and epidermal cells resulting from hybridization. Reviewing the work of F. Dyckerhoff, Standfuss, Zurich, and Huemer on melanism of butterflies, the author concludes that melanism is clearly hereditary and readily influenced. Citing the work of Ladebech, Gortner, Spottel, L. Jones, and K. Paul on melanism in fowls, he notes that the more highly bred fowls lack transitional types of pigment cells. Gortner's distinctions between dull yellow-black-brown melanism and bright yellow-red-brown melani-protein appear less simple than they at first seemed. Observations on distribution of birds are given to show that climatic conditions determine the expression of coloration of different types.—*M. Mann.*

1712. HARMS, W. **Das Problem der Geschlechtsumstimmung und die sogenannte Verjüngung. [The problem of sex modification and so-called "rejuvenescence."]** Naturwissenschaften 11: 184–189. 1921.—Experiments on the effects of gonad transplanation, particularly those of Steinach, are not entirely corroborated by the author's researches on very young porpoises. The transplanting of ovaries into a very young male did not result in the development of the rudimentary uterus present at birth. The results were essentially those of

castration with the exception that the milk glands were abnormally developed for males. Similar experiments with the toad produced no positive results, yet some variation from normal secondary characters and sexual instincts were noted.—Dogs were used to study the results of gonad transplantation on senility. In each case placing ovaries of young dogs in bodies of old dogs caused death, although the operation itself appeared successful. One showed fresh corpus lutea, another an embryo in the uterus. The testes of a young dog were transplanted into a 17-year-old dog showing all the characters of senility. After the operation the dog lost the senile appearance, taking on the typical characteristics of a young dog. A correlated influence of the hormones of the testes with those of other secretions resulting in rejuvenation is suggested.—*J. L. Collins.*

1713. HAUPTMANN, ALFRED. **Grundlagen, Stellung und Symptomatologie der "myotonen Dystrophie." [Basis, location, and symptomatology of myotonic dystrophy.]** Deutsch. Zeitschr. Nervenheilk. 63: 206–249. 1919.—Myotonic dystrophy is certainly an hereditary disease. In the great majority of cases symptoms are found in the parents of the patient. Cataract is practically always present for generations before the myotonic dystrophy appears. Probably the "Anlagen" of the other symptoms are also present, each inherited independently. Cataract is then dominant, the other symptoms recessive; sooner or later all of them appear. If, as sometimes happens, no symptoms are found in the parents, they may be considered latent. Very often brothers and sisters of one afflicted with myotonic dystrophy are weak-minded, and there are many signs of degeneration in the family history.—*B. Whiteside.*

1714. HAYES, HERBERT KENDALL, AND RALPH JOHN GARBER. **Breeding crop plants.** *15.5 × 23.5 cm., 328 p., 66 fig.* McGraw-Hill Book Co.: New York, 1921.—This book presents the fundamental principles of crop breeding, summarizes the known facts regarding the inheritance of many important characters of the commoner crop plants, and suggests methods of breeding for each of the more important field crops. The 1st 2 chapters review the work of the pioneer plant breeders and summarize the principles of plant genetics as a basis for crop improvement. The next 3 chapters deal with the mode of reproduction in various crop plants in relation to the technique employed in breeding them, emphasizing field-plot technique and factors influencing the reliability of results of field-plot trials, and including the technique of controlled pollination in certain plants. The next 14 chapters are devoted to a consideration of classification, inheritance of various characters, methods of breeding, and results of selection and crossing of wheat, oats, rye, barley, buckwheat, rice, cowpeas, soy beans, velvet beans, flax, tobacco, cotton, sorghum, maize, several grasses, clovers, alfalfa, potatoes, and various fruits and vegetables. A glossary of plant breeding and genetic terms and a bibliography of the more important plant breeding and plant genetics contributions are appended.—*C. B. Hutchison.*

1715. HENRY, J. K. **Ribes divaricatum × Ribes Lobbii.** Canadian Field Nat. 33: 94. 1919.—George H. Knight, nurseryman of British Columbia, found on Vancouver Island a peculiar gooseberry growing among wild plants of *Ribes divaricatum* Dougl. and *R. Lobbii* Gray. The new type resembles *R. Lobbii* in many respects, in others it is quite similar to *R. divaricatum.* Descriptions are given of each species and of the supposed hybrid. That this is a hybrid can not now be decided as it has not fruited. *Ribes* hybrids are not easily produced, and natural hybrids are unknown in North America.—*A. C. Fraser.*

1716. HOCHÈ, LÉON, ET RENÉ MORLOT. **Evolution parthénogénétique de l'ovule dans l'atrophie de follicule à l'état de maturité. [Parthenogenetic development of the egg in a case of atrophy of the follicle.]** Compt. Rend. Soc. Biol. 83: 1152–1154. 1920.—The authors observed in the ovary of a girl 12 years old an egg the periphery of which was divided into small cells, the remainder composed of transparent granular yolk. The latter contained numerous chromatic elements in balls varying in volume and position. No evidence of a spindle was present. One of the small cells was seen in anaphase. Flemming, Henneguay, and others have reported similar cases in which segmentation of the egg seems to occur not by regular cell division but by gemmation. The authors interpret these cases as the beginnings of parthenogenetic development, but only as another phenomenon of degeneration.—*C. L. Parmenter.*

1717. Honda, H. **Spermatogenesis of aphids; the fate of the smaller secondary spermatocyte.** Biol. Bull. 40: 349–368. *4 pl.* 1921.—In *Stomaphis yanois* the diploid number of chromosomes is 10. The 1st spermatocyte division results in unequal cells. Eight chromosomes divide and are distributed equally to secondary spermatocytes, while 2 lag and then go undivided to a larger cell. The larger cell divides equally and forms 2 functional spermatozoa. The smaller secondary spermatocyte divides equally, the 2 small cells elongate, become active, and move toward sustentacular cells, but do not become attached; unable to obtain nourishment, they degenerate, their length being reduced and the cytoplasm increasing around the nucleus. In *Neothomasia populicola* and *Macrosiphum ambrosia* the smaller secondary spermatocyte divides, but spermatids do not develop.—*A. Franklin Shull.*

1718. Hovasse, R. **L'activation parthénogénétique des oeufs de grenouille rousse (Rana temporaria L.) dans les milieux hypotoniques et hypertoniques. [Parthenogenetic activation of the eggs of Rana temporaria L. in hypotonic and hypertonic solutions.]** Compt. Rend. Acad. Sci. Paris 172: 1137–1139. 1921.—The author placed unfertilized frog eggs, from the uterus, in water to allow the jelly to swell, then removed the jelly and returned the eggs to distilled or tap water (distilled water is much more effective than tap water). The eggs swell, shrink, and swell again until the 1st cleavage appears. In unfertilized eggs, from the uterus, placed in various solutions,—e.g., LiCl, NaCl, KCl, various sugars, urea,—and transferred after 2–3 hours to tap water, segmentation occurred in 6–7 hours. Removal of the jelly is favorable. Best results are secured with hypotonic salts, and with iso- or hypertonic non-electrolytes. Osmotic pressure does not offer a complete explanation, as imbibition by cell colloids is also involved.—*C. L. Parmenter.*

1719. Hutchison, C. B. **Heritable characters of maize. VII. Shrunken endosperm.** Jour. Heredity 12: 76–83. *Fig. 20–24.* 1921.—Plants from kernels with shrunken endosperm, occurring in maize from the Ponka Indians in Nebraska, bred true for this character, which was shown to be inherited as a simple recessive to the normal endosperm and is designated by the genetic symbol *sh*. F_2 of crosses between normal and *sh* deviated but slightly from the 3:1 relation and in back-crosses but slightly from 1: 1, indicating that shrunken endosperm is differentiated from the normal by the single factor pair *Sh sh*. Selfing an F_1 plant of the cross between a homozygous red-aleurone shrunken plant of the genetic constitution *C C sh sh* with a colorless-aleurone non-shrunken plant, *cc Sh Sh*, produced an ear with both shrunken and non-shrunken as well as colored and colorless kernels, but with all shrunken kernels colored. This indicated that the *Sh sh* and *Cc* factor pairs are linked.—Progenies from back-crosses between F_1 plants and the double recessive suggest that the factor pair *Sh sh* belongs to the same linkage group as *Cc* and *Wx wx*. Several F_1 plants of the cross non-shrunken waxy (*Sh Sh wx wx*) × shrunken starchy (*sh sh Wx Wx*) back-crossed to double recessive shrunken waxy plants produced kernels as follows: Non-shrunken starchy 229, non-shrunken waxy 813, shrunken starchy 833, shrunken waxy 230.—The very close approximation of the *Sh sh*—*Cc* linkage relation by that of *Sh sh*—*Ii* suggests that *Cc* and *Ii* are very closely linked, or are on opposite sides of *Sh sh* and approximately equally distant, or are allelolorphic. *H. M. Steece.*

1720. Kanda, M. **Field and laboratory studies of Verbena.** Bot. Gaz. 69: 54–71. *4 pl., 26 fig.* 1920.—Several intermediate types were found between the 3 established species, *V. angustifolia*, *V. stricta*, and *V. hastata*. Cytological studies on these 3 and on an intermediate between the last 2 showed 4 haploid chromosomes in *V. angustifolia*, 6 in the others. Some of the developmental characters of the intermediate types resemble *V. stricta*, some *V. hastata*, and some are intermediate. Chromosome behavior is normal and similar in all three.—*Merle C. Coulter.*

1721. Krieg, Hans. **Über die Bildung von Streifenzeichnungen bei Säugetieren. [On the formation of the striped coat pattern in mammals.]** Anat. Anzeiger 54: 33–40. *6 fig.* 1921. —Three types of striping of mammalian coat patterns are recognized: (1) Zebra-tiger-hyena pattern with vertical stripes over the body, circular stripes at the extremities, and stripes

forming a pointed arch in the regions where body and extremities meet; (2) longitudinal stripes presumably a primitive pattern, as found in young swine and tapirs; and (3) "streaming" type, found only in domestic animals (cattle and dogs principally), in which vertical striping extends over back and rump, and circular striping fails to develop on the extremities. Each of these types appears to be hereditary, although asymmetrical and fortuitous patterns may arise, due to developmental dynamics. The author's researches in perissodactyls and their hybrids lead him to believe that the striping pattern and its variations are correlated with accompanying or resultant phenomena of growth processes. He observed that the 1st type of striping is closely related to the folds in the skin of young mammals, especially of newly born rabbits. He believes this folding due to specific pulling and pressure relations on the skin. On the basis of data submitted by Schumacher on a foetal wild hare, the author establishes a relation between the median stripe of the foetal hare and the 2nd type of striping as represented in the dorsal stripe of *Equidae*, and regards the flecking such as occurs in the civet cat and *Viverridae* in general as a transitional phase between the 2 types. Schultz's experimental induction of black melanin formation in albino rabbits by means of cold applied to the high folds of the skin, is noted, but the author thinks that the stripes in cases he has studied follow the infolds of the skin. It is suggested that the patterns are due to "biological interference" at a critical developmental stage, and are related to the arrangement of pigment-forming cells in rabbits of English pattern, whose spotting conforms in a broken way to type 1.—*Edward N. Wentworth.*

1722. Kuiper, K. **Color inheritance in cattle.** Jour. Heredity 12: 102–109. *Fig. 1–8.* 1921.—The author reports a study of inheritance of color in Dutch Belted cattle. These cattle are usually black and belted, but self-black, self-red, and red belted are occasionally produced. Also, there are wide variations in the belting pattern. From matings of belted bulls and belted cows 50 calves were produced, 7 of which were self-colored (6 blacks, 1 red) and 43 belted. A belted bull was mated to more than 60 piebald heifers, 6 of them red and white, but most of them black and white. Of 55 calves produced, 27 were belted, 24 or 25 self-colored, and 3 or 4 pied. The self-colored were in general coal-black, but some showed a small white spot on belly, forehead, or tail-end. In only 1 case was it doubtful whether the animal was self-colored or pied. Crossing a piebald bull and belted cows gave 18 belted, 2 self-colored, and 1 piebald. Differences between the 2 ratios can be explained on the basis of different genetic constitution of parents in the 2 crosses. Irregularity of color patterns in the cross-breds is discussed. Taking B = belt, b absence of belt; S = self-colored; and s = piebald pattern, the ratios obtained could be accounted for by a repulsion between B and S giving 1:7:7:1. If the belted bull were of the formula $BbSs$ he would form gametes in the following proportion: 1 BS : 7 Bs : 7 bS : 1 bs. Mating such a bull to pied cows ($bbss$) the result would be 1 $BbSs$: 7 $Bbss$: 7 $bbSs$: 1 $bbss$, or 8 belted, 7 self-colored, and 1 pied, which agrees closely with observed results. Other types of mating are discussed in the light of this explanation.—*E. Roberts.*

1723. Lakon, Georg. **Die Weissrandpanaschierung von Acer negundo L. [White-margin variegation of Acer negundo.]** Zeitschr. Indukt. Abstamm.- u. Vererb. 26: 271–284. *14 fig.* 1921.—The white-edged leaves of a tree of *Acer negundo* are shown to be due to a periclinal chimera constitution of the chlorophyll-containing cells, a phenomenon similar to that in *Pelargonium*. Some stems and branches show the variegation as sectorial chimeras. The whole plant is considered a "highly complicated, mixed chimera," both periclinal and sectorial in nature. Inheritance of this variegation is not given.—*E. W. Lindstrom.*

1724. Laughlin, Harry H. **Dice-casting and pedigree selection. Experiments which picture mathematically close analogies between dice-casting and certain breeding phenomena.** Genetics 6: 384–398. *3 fig.* 1921.—By suitable casting of dice, it is possible to picture mathematically various phenomena of inheritance, such as filial regression, the rating of pure lines, the effect of selection within pure lines, and the effect of selection based on the somatic character. Six dice, lettered a to f, are used. The faces of die a are marked 1–6; of die b, 2–7; of die c, 3–8; and so on to die f, which is lettered 6–11. Each die represents a definite geno-

type, and each face a possible phenotype resulting therefrom. Die *a* may produce 5 phenotypes (2, 3, 4, 5 and 6) similar to certain phenotypes produced by die *b*, representative of a 2nd genotype. Die *a* may also produce 4 phenotypes (3, 4, 5 and 6) similar to certain phenotypes produced by die *c*; 3 similar to phenotypes produced by die *d*; 2 similar to phenotypes produced by die *e*; and 1 similar to a certain phenotype produced by die *f*. The records of actual castings so designed as to produce results comparable to filial regression, rating of pure lines, pure-line selection, and somatic selection are presented in 5 tables.—*Edward N. Wentworth.*

1725. La Vaulx, R. de. **L'intersexualité chez un Crustacé Cladocère: Daphne atkinsoni Baird. [Intersexuality in a cladoceran, Daphnia atkinsoni.]** Compt. Rend. Acad. Sci. Paris 169: 97–99. 1919.—The author thinks improper nutrition one of the causes of the appearance of intersexes, of which 135 were obtained. (In an earlier paper he attributed intersexes to unfavorable nutrition during a sexual cycle.) Intersexuality is inherited, but in most irregular fashion. One side of an animal is frequently more modified than the other, but every part capable of sexual modification may be intermediate in its sexual character. Gonads are usually functional ovaries, but rarely may be part ovary and part testis and produce both eggs and sperm. The writer abandons the term gynandromorph formerly applied to his abnormally sexed *Cladocera* and uses the term intersex, although objecting to the reviewer's distinction between the terms gynandromorph and sex intergrade (or intersex).—*A. M. Banta.*

1726. Leitch, I. **A study of the segregation of a quantitative character in a cross between a pure line of beans and a mutant from it.** Jour. Genetics 11: 183–204. *4 fig.* 1921.—The author, continuing Johannsen's work with brown Princess beans crossed with a long-seeded, evidently homozygous, mutant from the strain, secured F_2 plants showing a transgressive distribution in 1 direction. Of these he planted 4 types, 1 representing each original parent, 1 intermediate, and 1 the limit of transgressive variation. The original mutant type, the *M* type, bred true, as did those of the intermediate and of the transgressive variation type, the *X* type. The original pure line type, the *E* type, showed segregation according to simple 3:1 ratio. The results, 38 of *M* type and 112 each of *E* and *X* types, were in general confirmed by further work. The simplest explanation is that a factor has been modified in the original pure line to give the mutation. The theory of loss of a factor or factors obviously can not be applied.—*L. R. Waldron.*

1727. Lenz, F. **Über geschlechtsgebundene Erbanlagen für Augenfarbe. [Sex-linked factors for eye color.]** Arch. Rassen- u. Gesellschaftsbiol. 13: 298–300. 1921.—Lundborg has gathered statistics showing that in Sweden 5.2 ± 13 per cent males and 11.2 ± 1.9 per cent females have brown eyes, in Finland, 6.3 per cent males and 11.3 per cent females. The female rate being double the male rate indicates that the factor for brown eyes may lie in the sex chromosome, which is double in females and single in males, the egg having double the chance of getting the brown-bearing chromosome from the sperm. As the proportion of brown increases in the population the female percentage will not be double the male, because the chance that the brown-eyed female is duplex brown is increased and therefore the potency of certain of the brown-bearing sperm is masked by the brown chromosome already in the egg.—This law of sex-linking of brown eye color can not be generalized. It does not apply to data from middle Europe or America. Perhaps it is a property of the Mongoloid race.—*C. B. Davenport.*

1728. Levine, C. O. **The water buffalo—A tropical source of butter fat.** Jour. Heredity 11: 51–64. *9 fig.* 1920.—The author describes the water buffalo of China and presents data on its reproduction, diseases, and uses as a draft and dairy animal. Analyses of the milk showed an average of 12.5 per cent fat, 3 times that of dairy cows. The quantity of milk produced is less, but the amount of butter fat compares favorably with that produced by good cows. The author believes that rapid improvement can be made by selection, and that immunity to tick fever and tuberculosis in addition to its dairy qualities will make the buffalo the leading dairy animal of South China. He comments on its possible usefulness in the U. S. A.—*Sewall Wright.*

1729. LIPPINCOTT, W. A. **Further data on the inheritance of blue in poultry.** Amer. Nat. 55: 289–327. *3 pl.* 1921.—The author's summary is as follows: (1) It has been shown that the development of black pigment in the blue-splashed, blue and black races of the Andalusian and Orpington breeds, and of black Langshans, depends upon the action of a dominant hereditary factor *P*, for which they are normally homozygous. (2) The allelomorph of *P* is *p*. Individuals homozygous for *p* are white, as in white Wyandotte and white Plymouth Rock breeds. (3) The extension of black pigment to all feathers of the body, resulting, if no pattern factors are present, in self-colored individuals, depends upon a dominant factor *E*. This factor has been found in the Andalusian, Orpington, white Plymouth Rock, white Wyandotte and black Langshan breeds. Some evidence is presented which indicates its presence in white Leghorns. (4) The blue appearance of blue and blue-splashed Andalusians and Orpingtons is due to the arrangement and restriction of black pigment, the result of a dominant factor *R*. This factor has also been found in individuals of the white Wyandotte and white Leghorn breeds, though its presence is probably not usual in these breeds. (5) No individuals of the Andalusian, Orpington, white Plymouth Rock, white Wyandotte, or black Langshan breeds have been found which did not carry *R*, *E*, or both. (6) The mutual relations of *R* and *E* are such that they have never been found together in the same gamete. This indicates that they are allelomorphic, i.e., occupy identical loci on homologous chromosomes, or, each is so closely linked to the recessive allelomorph of the other, (*Re*) and (*rE*), that crossing-over rarely, if ever, occurs. (7) No evidence of crossing-over between *R* and *E* has been found and the tentative conclusion must be in accord with that previously held, that *R* and *E* are allelomorphs. (8) Both *R* and *E* are independent of *P* in their hereditary behavior, though dependent upon its presence for their manifestation. (9) The cooperative influence of the ovary is necessary for a full expression of *R* in the regions of the neck, back, and saddle. (10) On the basis of the evidence presented in the body of this paper the genetic formulae of the breeds and varieties employed, with respect to the factors under observation, are usually as follows: Blue-splashed Andalusians and Orpingtons $PP(Re)$ (Re); blue Andalusians and Orpingtons $PP(Re)$ (rE); black Andalusians, Orpingtons, and Langshans $PP(rE)$ (rE); and white Plymouth Rocks and Wyandottes $pp(rE)$ (rE). (11) The possibility of the occurrence of factors which duplicate the somatic effects of *R* and *E* is pointed out, and the relation of this possibility to the production of constant-breeding blues briefly discussed.—*H. G. May.*

1730. LOTSY, J. P. **Grondbeginselen van oordeelkundig fokken en telen. [Principles of breeding.]** Mededeel. Ver. Bevord. Wetenschapp. Teelt 13: *47 p.* 1921.—This is a general treatise on breeding animals and plants.—*J. C. Th. Uphof.*

1731. LOVE, H. H., AND W. T. CRAIG. **Fertile wheat-rye hybrids.** Jour. Heredity 10: 195-207. *11 fig. and frontispiece.* 1919.—From a cross of Dawson Golden Chaff wheat (*Triticum vulgare*) ♀ and common rye (*Secale cereale*) ♂ 1 F_1 plant was obtained, the hybrid nature of which was indicated by a few tip awns, brown glumes intermediate in size but keeled—more as in rye—and ciliate, and slightly pubescent peduncle. One seed was produced from which an F_2 plant was grown. This generation showed in many ways its rye parentage, and again only 1 viable seed was produced. The F_3 plant resulting was more like wheat than the earlier generations, showing hybrid characters to a limited extent, and produced many seed. The several F_4 plants grown varied widely as to awns and color of chaff and kernel segregations being in a 3:1 ratio. The heads were wheat-like in appearance but in some respects showed their hybrid origin, as did also the plants. Some were fully fertile, others nearly sterile. Some F_4 families have been carried further, being grown in the field to test their winter hardiness.—*C. E. Leighty.*

1732. MANSON. **Hereditary spastic paraplegia with ataxia and mental defect.** British Med. Jour. 2: 477. 1920.—One brother and 3 sisters each develop rather complex, but almost identical, syndromes of severe symptoms, beginning at about the 7th year. Syphilis and alcoholism are excluded. Both parents are alive and well, but the paternal grandfather was an invalid concerning whom there is no further information.—*C. H. Danforth.*

1733. MORGAN, T. H. **The genetic and the operative evidence relating to secondary sexual characters.** Carnegie Inst. Washington Publ. 285. *108 p., 10 pl. (7 colored).* 1919.—This is a detailed account of the author's experiments in castrating hen-feathered males, (with resultant assumption of cock feathering) and of crosses between hen-feathered and cock-feathered races. Hen-feathering is dominant and segregation occurs in F_2, according to the di-hybrid scheme. A description of the complex colors of the various hybrid offspring is given. There is an extended review and discussion of the literature dealing with secondary sexual characters, especial attention being paid to endocrine cells, hermaphroditism in poultry, and theories, notably Darwin's, that attempt to account for secondary sexual characters.—*H. D. Goodale.*

1734. PAYNE, FERNANDUS, AND MARTHA DENNY. **The heredity of orange eye color in Drosophila melanogaster.** Amer. Nat. 55: 377–381. 1921.—The authors have worked out the genetics of the eye color of orange-eyed males, which have arisen in the stock called "reduced." It occurs when 2 sex-linked genes, salmon (later proved identical with garnet) and salmon-modifier, are present. These genes are not closely linked, but salmon-modifier is very close to reduced. Salmon-modifier has apparently become homozygous, though not visible, in reduced stock, and does not modify the normal red eye color except in the presence of salmon.—*John S. Dexter.*

1735. PEARL, RAYMOND. **On a single numerical index of the age distribution of a population.** Proc. Nation. Acad. Sci. [U. S. A.] 6: 427–431. *2 fig.* 1920.—This paper presents a formula for an arbitrary index of the age distribution of a population for use in such problems as correlation, where only a single value can be used to represent the condition in each community. The suggested index is obtained by comparing the percentage age distribution of the population of the community with the percentage age distribution of a standard population. The population given by the L_x line of Glover's United States Life Table for 1910 is the standard chosen. The formula is:

$$\phi = S\left\{\frac{\Delta^2}{P}\right\}(M - M_P)$$

where P is the percentage in a given age group in the standard population, Δ the deviation of the percentage in the corresponding age group of the population of the community from the percentage of the standard population, S the summation of these percentage squared deviations for the different age groups, and M and Mp the mean ages of the population of the community and of the standard population, respectively. As an illustration of the use and reliability of the index the values for 34 American cities are presented and discussed.—*Sylvia L. Parker.*

1736. PÉZARD, A. **Loi du "tout ou rien" ou de constance fonctionnelle, relative à l'action du testicule considéré comme glande endocrine. [Law of "all or nothing" or of functional constancy relative to the action of the testis considered as an endocrine gland.]** Compt. Rend. Acad. Sci. Paris 172: 89–92. 1921.—The author presents data which indicate that a mass of testicular tissue weighing approximately 0.5 gr. implanted in the peritoneum of a castrated cock brings about the complete redevelopment of secondary sexual characters, both morphologic and psychic. A smaller mass registers no noticeable effect, and increasing the mass to as much as 42.0 gr. gives no greater effect than the 0.5 gr. mass.—*William A. Lippincott.*

1737. PÉZARD, A. **Temps de latence dans les expériences de transplantations testiculaire et loi du "tout ou rien." [Latent period in the experiments with testicular transplantation and law of "all or nothing."]** Compt. Rend. Acad. Sci. Paris 172: 176–178. 1921.—The author implanted testicular tissue in cocks at the time of castration, after which there was a period of regression in the secondary sexual characters followed by their rather rapid redevelopment. The author thinks the period of regression, 2–6 weeks, represents the time necessary for the implanted tissue to acquire a weight of 0.5 gram.—*William A. Lippincott.*

1738. PHILLIPS, J. C. **A further report on species crosses in birds.** Genetics 6: 366–383. *5 fig.* 1921.—A continuation of crosses between various species of ducks on the one hand and different species of pheasants on the other confirms the author's previous assumption that segregation of characters in the 2nd hybrid generation is more pronounced in closely related species and less pronounced in distantly related ones. The results are explained on the basis that a smaller number of character differences in the closely related species permits the small numbers of offspring observed (not more than 100 in any case) to include a larger proportion of the possible combinations than is the case with the large number of differences in widely differing species. In the latter cases only the very middle of the distribution curve has been touched. Sex-linked characters were not observed.—*H. G. May.*

1739. PINN, A. J. **An experiment in selection.** Agric. Gaz. New South Wales 32: 731. 1921.—In a series of (bin?) tuber selections of potato seed, 2 lots selected were second-growth tubers broken from larger tubers. Yields from these 2 lots were more than 60 per cent greater than secured from ordinary selected seed. The difference is ascribed largely to the fact that second-growth tubers were immature.—*L. R. Waldron.*

1740. PITT, FRANCES. **Notes on the genetic behaviour of certain characters in the polecat, ferret, and in polecat-ferret hybrids.** Jour. Genetics 11: 99–115. *2 pl., 1 fig.* 1921.—The paper deals with the genetic behavior of color and certain cranial characters in the ferret, *Martes furo* L., polecat *Mustela putorius* L., and in their hybrids. The 2 species are compared as regards color, facial markings, shape of head, cranial characters, disposition, and susceptibility to disease. F_1 hybrids show complete or very nearly complete dominance of the polecat type except in cranial characters, and "when the hybrids were bred back to the polecat, animals that were apparently pure polecats resulted." In the other back-cross polecat coloration and temperament were soon lost. Evidence is presented that erythristic (red) in varieties of polecat and ferret is a Mendelian character appearing with the loss of a "*D*" (dark-brown) factor, which "seems to be correlated with increased size. . . ." The author regards as most important "the indication of Mendelian inheritance of a structural character (type of skull), and the evidence concerning a variation due to the loss of a factor appearing and maintaining itself in nature" (the erythristic polecats).—*A. W. Bellamy.*

1741. POMEROY, C. S. **Bud variation in Eleagnus.** Jour. Heredity 12: 227–230. *Fig. 19–20.* 1921.—The author refers to the common occurrence of variegated evergreen shrubs in Southern California, and describes 2 variegated forms of *Eleagnus pungens*, *E. pungens* var. *aurea* Servettaz and *E. pungens* var. *Frederici variegata* Servettaz, in a Riverside park. Servettaz is quoted on the difficulties of classifying species of *Eleagnus* because of extreme variation.—"There is no doubt of the bud origin of the variegated forms described and illustrated herewith nor of bud generations under the continual asexual propagation of ordinary horticultural practice."—*C. S. Crandall.*

1742. PRELL, HEINRICH. **Reine Kette, Genospezies und Stirps.** [**Pure chain, genospecies and stirps.**] Zeitschr. Indukt. Abstamm. u. Vererb. 26: 287–294. 1921.—The term pure chain is applied to allogamous (bisexual or cross-fertilized) organisms in the same sense in which pure line is used for autogamous organisms having the same genetical construction. A genospecies contains individuals of only 1 pure line or 1 pure chain. Stirps is used for haploid organisms as species is used for diploid organisms.—*D. F. Jones.*

1743. RAWES, A. N. **Self-fertility and self-sterility in plums.** Jour. Roy. Hort. Soc. 46: 353. 1921.—The author worked with plums in a greenhouse from which insects were excluded. Pollination was accomplished by brushing stigmas with ripe stamens. The following varieties proved self-sterile: Coe's Golden Drop, Decaisne, Grand Duke, Jefferson, Kirke's Blue, Late Orange, Late Transparent Gage, Pond's Seedling, Comte d'Althan, Transparent Gage, and Washington. The self-fertile varieties were: Dennistons Superb, Monarch and Czar; and the partially self-fertile: Early Rivers, President, Prince Engelbert, and Stint. All varieties were cross-fertile except Coe, Jefferson, President, and Late Orange; the last 2 appeared to be inter-sterile. No difference was observed in size and shape of fruit or stone due to the kind of pollen used.—*A. H. Hendrickson.*

1744. Rawitscher. [German rev. of: Saito, Kendo, und Hirosuke Naganaski. **Bemerkungen zur Kreuzung zwischen verschiedenen Mucor-Arten.** (Notes on a cross between different species of Mucor.) Bot. Mag. Tôkyô 29: 1915.] Zeitschr. Bot. 13: 646. 1921.

1745. Renner, O. [German rev. of: Lehmann, Ernst. **Zur Terminologie und Begriffsbildung in der Vererbungslehre.** [Terminology, and formation of genetical concepts.] Zeitschr. Indukt. Abstamm. u. Vererb. 22: 236–260. 1920.] Zeitschr. Bot. 13: 661–665. 1921.

1746. Saunders, E. R. **On a graded series of forms in Matthiola.** Rept. British Assoc. Bournemouth Meeting 1919–1920: 339. 1920.—In addition to hairy and glabrous types of *M. incana*, there is a rare intermediate type, "half-hoary." Crosses between "half-hoary" and glabrous give an intermediate hybrid. This, together with its parents and the common hairy type, forms a graded series as regards hairiness, the range of 1 grade overlapping the next. Each grade has a distinct genetic behavior, explicable on the assumption of multiple allelomorphs.—*Merle C. Coulter.*

1747. Savelli, R. **Apomissia ed ibridisazoni difficili in Nicotiana.—Nota preventiva. [Apogamy and difficult hybridization in Nicotiana. Warning.]** Bull. Soc. Bot. Ital. 1920: 22–30. 1920.—The author notes the occurrence of apogamy, parthenocarpy, and phenospermy in *Nicotiana* and comments on their significance in hybridisation. Parthenocarpy, accompanied by formation of some viable seeds, was observed in various forms of *N. rustica* when only a few castrated flowers were left on plants, but no instances of it were found in trials of several forms of *N. Tabacum*. In cases of easy hybridisation apogamy need not be considered because development of many fertilized ovules makes conditions for it unfavorable, but when hybridisation is difficult fertilization of some ovules may result in stimulating adjacent ones to develop without fertilization. Thus, seed secured from *N. rustica* pollinated with *N. Tabacum* produced both hybrid individuals and plants exhibiting purely maternal characters. In wide crosses, such as species of *Nicotiana* with *Petunia*, *Verbascum*, etc., any seed produced is the result of apogamy. The author disagrees with Splendore (Catalizzatori o stimolanti fecondativi e mutamenti in Nicotianae. Bull. Tec. Colt. Tab. Scafati 1–2. 1915), who attributes such cases to "stimulative fertilization." The author's evidence shows, in addition to parthenocarpy, occasional crosses in which some viable seeds were produced, but these always yielded plants having purely maternal characters. Splendore obtained from *N. Tabacum* with *Verbascum* pollen plants of 3 types, viz., intermediate, maternal, and paternal, but repeated trials of this cross by the author yielded no viable seed. The importance is emphasized of studying apogamy in cases of difficult hybridization, and it is pointed out that, although Mendel's law provides a satisfactory explanation of results of varietal crosses, very little is known of phenomena involved in hybridization of different species and genera.—*R. E. Clausen.*

1748. Schmidt, Johs. **Racial investigations. III. Experiments with Lebistes reticulatus (Peters) Regan.** Compt. Rend. Trav. Lab. Carlsberg 14^5: 1–8. 1919.—The character examined is the number of rays of the dorsal fin, which varies from 5 to 8. The investigation consists of: (1) Experiments in which the mother is subjected to different temperatures during the various periods of gravidity, and which show that the number of rays in the offspring is distinctly influenced by the temperature to which the mother has been exposed; and (2) experiments in which the various mothers are subjected to the same environmental conditions, being in the same aquarium, at a constant temperature. There appeared to be a great difference (about 1 : 2) between the average number of rays in the offspring of mothers with 6 and 8 rays, respectively.—Though the number of organs is influenced by environment there are differences of an inheritable quality between the various individuals. The racial differences in fish are genotypical as well as phænotypical.—*Vilh. Ege.*

HORTICULTURE

J. H. GOURLEY, *Editor*
H. E. KNOWLTON, *Assistant Editor*

(See also in this issue Entries 1448, 1459, 1471, 1479, 1498, 1515, 1526, 1545, 1546, 1553, 1591, 1654, 1671, 1676, 1684, 1695, 1731, 1743, 1896, 1897, 1899, 1901, 1908, 1976, 2021)

FRUITS AND GENERAL HORTICULTURE

1749. ANONYMOUS. **Algunas de las mas antiguas y mejores variedades europeas del peral. [Some of the oldest and best European varieties of pears.]** Rev. Agric. [Mexico] 6: 204–205. *1 fig.* 1921.—The author gives technical descriptions of the fruit of 16 varieties of pears.—*J. A. Stevenson.*

1750. ANONYMOUS. **Tratamento das mangueiras. [Treatment of mango trees.]** Bol. Agric. [Nova Goa] 2: 12–15. *2 fig.* 1920.—Directions are given for pruning mango trees so as to secure maximum yields. The necessity of treating pruning wounds is emphasized.—*John A. Stevenson.*

1751. BALME, JUAN. **Algunos datos sobre el cultivo de la piña. [Notes on pineapple culture.]** Rev. Agric. [Mexico] 6: 147–151. *5 fig.* 1921.—The writer discusses the possibilities of pineapple culture in the region between Vera Cruz and Tampico, including a consideration of soils, climatic conditions, and varieties.—*John A. Stevenson.*

1752. BENAIGES DE ARÍS, CARMELO. **Regeneración del olivar. [Regeneration of olive groves.]** Bol. Agric. Téc. y Econ. [España] 13: 313–358. *12 fig.* 1921.—The olive's importance in Spain is pointed out, and production statistics given. Yields are low, averaging only 806 kgr. of fruit per hectare as against an average of 1500–3000 kgr. in France. This is due to many factors, including excessive interplanting of other crops; pests and diseases; and general neglect. Corrective measures are outlined.—Sooty mold (*Anthennaria oleosophila*), which forms a black crust on the leaves, causes some injury. Copper sulphate is recommended, as well as insecticides, to control insects on the secretions of which the fungus lives. Other diseases are leaf spot (*Cicloconium oleaginum*), tuberculosis (*Bacillus oleae*), and root rots (*Armillaria mellea*, *Polyporus fulvus*, and *Dematophora necatrix*). Control measures are given.—*John A. Stevenson.*

1753. BENSON, C. H. **Report of work at Sitka station.** Rept. Alaska Agric. Exp. Sta. 1919: 19–21. 1920.—In the strawberry breeding work 1064 new hybrids came into bearing, and as a result of the 1918 breeding 1723 hybrids were set out. A report on raspberries, gooseberries, and currants is given. Crosses made in 1916 between the Cuthbert raspberry and a native yellow salmonberry (*Rubus spectabilis*) resulted in 1 good hybrid, named Bensonberry, showing characteristics of both parents. Tree fruits were not satisfactory. *Armeria formosa*, *Cerastium tomentosum*, *Lychnis arkwrightii*, *Pentstemon digitalis*, and *Primula acaulis* × *elatior* are added to the list of herbaceous perennials previously recommended. Of 35 varieties of hybrid roses set out in 1917 only 5 were alive in 1919, and these were in poor condition. *Rosa rugosa* and hybrids are again recommended. Tomatoes and cucumbers were grown in the greenhouse.—*J. P. Anderson.*

1754. BOVET, PEDRO A. **Sobre la estaca-raiz-injerto como medio de aumentar la produccion de injerto sobre membrillo. [An improved method of budding quince stocks.]** Bol. Agric. Provincia Buenos Aires 1[2]: 2–6. *9 fig.* 1919.—The author describes a method of budding pear and apple on quince stocks which is said to give much better results than the system of grafting commonly employed. During the winter the stocks are cut back to force a bushy growth, and in the spring soil is heaped around each plant to permit extensive root development. Buds are inserted in each shoot produced and finally each of these, with a corresponding portion of root, is separated for planting.—*John A. Stevenson.*

1755. Bunyard, E. A. **A handbook of hardy fruits. Apples and pears.** *205 p.* John Murray: London, 1920.—"This volume is designed to fill the place formerly occupied by Dr. Hogg's Fruit Manual, which has now been out of print for some time. In preparing the present handbook, the author has endeavored to provide information in a popular form without any loss of accuracy." A classification and Key is given for both apples and pears, 356 varieties of the former being described and 157 of the latter.—*J. H. Gourley.*

1756. Calvino, Mario. **Informe de los años 1918–1919 y 1919–1920 de la estación experimental agronomica. [Report of the agricultural experiment station for 1918–1919 and 1919–1920.]** Informe An. Estac. Exp. Agron. [Cuba] **1918–1920:** 1–786. *329 fig.* 1920.—During the 2 years under review experimental work has been carried on with a wide range of economic plants, including both indigenous and exogenous ones. The work has included varietal and cultural tests with the following plants: Sweet potatoes, cassava, malanga (*Xanthosoma* sp.), *Dioscorea* spp,, *Maranta arundinacea*, *Calathea allouya*, *Cacara erosa*, many types of Cucurbits (including *Sicania odorifera*, *Trichosanthes anguira*, *Benincasa* spp., *Cucurbita moschata*, *Lagenaria leucantha*), tomatoes, peppers, cabbage, brussels sprouts, *Solanum muricatum*, *Jatropha urens* var. *inermis*, strawberries, pineapple, banana, plantain, citrus, mango, coffee, cacao, grape, and *Clitoria ternatea*.—*John A. Stevenson.*

1757. Chasset, L. **Quelques traces de fixité chez certaines variétés fruitières. [Some traces of fixity of certain varieties of fruits.]** Rev. Hort. **93:** 298–299. 1921.—The seedlings of a number of varieties of apples and of pears often closely resemble the parents in various characters. Many examples are listed. It is possible that through long cultivation and vegetative multiplication of a variety greater fixity of its characters may be brought about.—*E. J. Kraus.*

1758. Crespo, Ulpiano. **El cafe, siembra, cultivo, recolección, y preparación. [Planting, cultivation, harvesting, and preparation of coffee.]** Rev. Agric. [Mexico] **5:** 625–629. *4 fig.* 1921.

1759. Eaton, S. V. **Weather and fruitfulness.** [Rev. of: Dorsey, M. J. **Relation of weather to fruitfulness in the plum.** Jour. Agric. Res. **17:** 103–126. *3 pl., 1 fig.* 1919 (see Bot. Absts. 3, Entries 1478, 1529).] Bot. Gaz. **69:** 269. 1920.

1760. Fantini, N. **Una breve e interesante reseña sobre los principales sistemas de podas. [A brief review of the principal pruning systems.]** Surco [Argentina] **1**[4]**:** 8–10. 1921.

1761. Gajón, Carlos. **Las fresas y su cultivo. [Strawberries and their culture.]** Rev. Agric. [Mexico] **6:** 142–147. *12 fig.* 1921.—This paper gives a popular account of strawberry culture under Mexican conditions; a list of varieties is included.—*John A. Stevenson.*

1762. Georgeson, C. C., and C. H. Benson. **Report of work at Sitka station.** Rept. Alaska Agric. Exp. Sta. **1918:** 22–33. 1920.—In the strawberry breeding work about 3000 seedlings fruited for the 1st time, and 1800 new seedlings were grown. One salmonberry-raspberry hybrid of 1916 bore promising fruit. Growing potatoes from seed balls is being continued with good results. Some crossing has been done with flowering plants. Vegetables which are favorably reported upon are: Cabbage, cauliflower, brussels sprouts, kale, kohl rabi, turnips, rutabagas, carrots, parsnips, parsley, chard, lettuce, radishes, peas, celery, and rhubarb. Chinese cabbage, beets, onions, leek, and spinach are not so satisfactory. Orchard fruits were reported upon unfavorably. Red raspberries, especially the Cuthbert, gooseberries, and currants produced well. Hybrids of *Ribes bracteosum* and *R. nigrum* produced fruit for the 1st time. Blueberries, dewberries, and blackberries are being tested. The eastern cranberry is a failure. Comparatively few ornamental trees and shrubs seem adapted to the climate. *Rosa rugosa* grows especially well, and 20 other roses survived the winter though 9 did not; 43 hardy perennials and 32 annuals are reported as satisfactory, while 2 perennials and 8 annuals were not successful.—*J. P. Anderson.*

1763. GIROLA, CARLOS D. **Fruticultura Argentina, apuntes y comentarios. [Notes on fruit culture in Argentina.]** Bol. Ministerio Agric. Nación [Argentina] 26: 29–59. *6 fig.* 1921.—By means of 5-year import tables the author shows the possibilities of developing the fruit-growing industry in Argentina. Brief suggestions for the culture of the following fruits are given: Peach, plum, cherry, pear, apple, quince, melon, watermelon, orange, lime, lemon, grapefruit, grape, fig, chetimola, guava, and others of minor importance. The best varieties of each which have been exhibited at local expositions are listed.—*John A. Stevenson.*

1764. IGLESIAS, R. M. **El cultivo del naranjo en el departamento de Rivera. [Orange culture in the Department of Rivera.]** Defensa Argic. [Uruguay] 2: 109–110. 1921.—Popular. —*John A. Stevenson.*

1765. INIGUEZ, IGNACIO FLORES. **El cultivo del naranja en Rio Verde, San Luis Potosi. [Orange cultivation.]** Rev. Agric. [Mexico] 5: 699–703. *1 fig.* 1921.—This article discusses varieties, planting, cultivation, pruning, picking, marketing, and enemies of the orange in the state of San Luis Potosi, Mexico.—*John A. Stevenson.*

1766. JIMENEZ, FAUSTINO W. **Cultivo de la fresa. [Culture of the strawberry.]** Rev. Soc. Rural Cordoba [Argentina] 20: 5324–5333. 1920.—General cultural directions and irrigation practice are given.—*John A. Stevenson.*

1767. LOPÉZ, CARLOS. **Cultivo de la jícama. [Jicama, or yam-bean, culture.]** Rev. Agric. [Mexico] 5: 624. *1 fig.* 1921.—Brief cultural directions are presented for *Pachyrhizus angulatus* (jícama de agua) and *P. tuberosus* (jícama de leche).—*John A. Stevenson.*

1768. MAZARIN. **Massnahmen zur Förderung des Zwetschenanbaues. [Measures for advancing prune culture.]** Mitteil. Deutsch. Landw. Ges. 36: 394–397. 1921.—In view of the reduced number of plum trees in Germany, due to loss of territory and winter killing, the author points out the need of selection, fertilizing, and other measures for increasing the supply of fresh and dried plums.—*A. J. Pieters.*

1769. POPENOE, WILSON. **Manual of tropical and sub-tropical fruits.** *xv+474 p., 24 pl., 62 fig.* Macmillan Co.: New York, 1920.—The author states that his intention is "to bring together for the guidance of those who live in the tropical and subtropical regions of the globe, the available information regarding the principal fruits cultivated or which may be cultivated in those regions."—The chief fruits treated are avocado, mango and its relatives, several annonaceous fruits, date, papaya and its relatives, loquat, fruits of the myrtle family, litchi and its relatives, sapotaceous fruits, kaki, pomegranate, jujube, mangosteen, breadfruit, etc. The author discusses the history, distribution, composition, and uses of the fruits, climate and soil, cultural methods, propagation, packing, marketing, and pests.—*J. H. Gourley.*

1770. RIVEROS, ERNESTO. **La poda de los frutales. [Pruning fruit trees.]** Rev. Soc. Rural Cordoba [Argentina] 20: 4994–5004. 1920.—Popular.—*John A. Stevenson.*

1771. SAEZ, DANIEL. **Los viñedos de Artigas. [The vineyards of Artigas.]** Defensa Agric. [Uruguay] 2: 112–114. 1921.—Suggestions are made for improving the viticulture of the district, including use of resistant roots, treatments for diseases, care in pruning, and selection of proper sites.—*John A. Stevenson.*

1772. SARABIA, GUILLERMO. **Cultivo del naranjo en Chile. [Orange culture in Chile.]** Bol. Soc. Agric. Norte [Chile] 10: 316–320, 325–328, 347–355, 375–379, 428–434. 1920.—Popular. —*John A. Stevenson.*

1773. SARABIA, G[UILLER]MO. **La arboricultura frutal en esta zona. [Fruit culture in this region.]** Bol. Soc. Agric. Norte [Chile] 10: 341–344. 1920.—This general discussion of fruit growing in North Chile includes a list of varieties of peach, plum, pear, orange, lemon, olive, grape, fig, quince, almond, walnut, apple, and cherry recommended for planting.— *John A. Stevenson.*

1774. Vallejo, Carlos. **La Riojo.** Bol. Ministerio Agric. Nación [Argentina] 25: 447–468. *9 fig.* 1920.—This is a report of a journey through part of the province of La Rioja to investigate the possibilities of olive culture. A list of indigenous economic plants is given. —*John A. Stevenson.*

FLORICULTURE AND ORNAMENTAL HORTICULTURE

1775. Anonymous. **Het bollenpellen en de arbeidswet.** [Bulb peeling and the labor law.] Weekbl. Bloembollencult. 32: 1–2. 1921.

1776. Dental, J. B. **Gerberas hybrides, race Dubois.** [The Dubois race of Gerbera hybrids.] Rev. Hort. 93: 312. *1 pl.* (*colored*). 1921.—A race of double-flowered, variously colored forms of the Transvaal daisy, fixed by M. E. Dubois, is easily grown and deserving of more general planting.—*E. J. Kraus.*

1777. Downing, A. J. **Landscape gardening.** *10th ed., revised by* F. A. Waugh. *xiv+439 p., 48 fig.* J. Wiley & Sons: New York, 1921.—This book includes several chapters from Downing's original Landscape Gardening and the Rural Essays, which first appeared in the Horticulturist.—*J. H. Gourley.*

1778. Gadeceau, E. **La primevère auricule; sa culture, ses variétés.** [Varieties and culture of Primula auricula.] Rev. Hort. 93: 336–337. *Fig. 83–84.* 1921.

1779. Gajón, Carlos. **Los mejores rosales.** [The best roses.] Rev. Agric. [Mexico] 6: 67–78. *8 fig.* 1921.—This description of the varieties of roses best adapted to Mexican conditions includes cultural directions and proper methods of pruning and propagating.—*John A. Stevenson.*

1780. King, Frances. **The little garden.** *x+94 p., 9 fig.* Atlantic Monthly Press: Boston, 1921.

1781. Laplace, F. **Le Rosier Paul's scarlet climber.** [Paul's scarlet climber rose.] Rev. Hort. 93: 352–353. *1 pl.* (*colored*). 1921.

1782. Laumonnier-Férard, E. **Gaillarde vivace hybride, var. Lady Rolleston.** [A hardy Gaillardia hybrid, Lady Rolleston.] Rev. Hort. 93: 332–333. *1 pl.* (*colored*). 1921.—This is considered the best clear yellow, large flowered variety; several others are listed.—*E. J. Kraus.*

1783. Lesourd, F. **Trois cèdres du Liban historiques.** [Three historical cedars of Lebanon.] Rev. Hort. 93: 350–352. *Fig. 89.* 1921.

1784. Letacq, A. **Le tulipier de Virginie aux environs d'Alençon.** [The tulip tree in the region of Alençon.] Rev. Hort. 93: 356–357. *Fig. 93.* 1921.—This species grows very rapidly, is thoroughly hardy, and apparently adapted to forest planting as well as to ornamental purposes.—*E. J. Kraus.*

1785. Mathews, J. W. **The cultivation of Proteas and their allies.** Jour. Bot. Soc. South Africa 7: 15–16. 1921.—The term "hard-wooded" applied to Proteas implies successful propagation from cuttings of ripened young wood or by grafts, but under the local conditions the easiest and most readily available method is by seeding.—*E. P. Phillips.*

1786. Mottet, S. **Campanula Van-Houttei.** Rev. Hort. 93: 347–348. *Fig. 87–88.* 1921. —Historical and cultural notes are given.—*E. J. Kraus.*

1787. Mottet, S. **Les Lewisia.** [The Lewisias.] Rev. Hort. 93: 329–331. *Fig. 79–80.* 1921.—*Lewisia cotyledon*, *L. Howellii*, and *L. vedrariensis*, a hybrid between the former 2, are suited to greenhouse culture and deserving of more extensive planting.—*E. J. Kraus.*

1788. OPAZO, AUGUSTO. **La haba. [Faba vulgaris.]** Bol. Soc. Agric. Norte [Chile]10: 335–357. 1920.—Popular.—*John A. Stevenson.*

1789. PROSCHOWSKY, A. R. **Un beau palmier hybride: Butiarecastrum Nabonnandi. [A beautiful hybrid palm.]** Rev. Hort. 93: 290–291. *Fig. 72.* 1921.—This beautiful hybrid between *Butia capitata* var. *pulposa* Becc. and *Arecastrum Romanzoffianum australe* Becc. was secured by M. P. Nabonnand some 30 years ago. It scarcely resembles either parent, is of rapid growth, and would probably withstand a temperature of −15° C.—*E. J. Kraus.*

1790. RAGIONIERI, A. **Nouveaux muguets hybrides à grandes fleurs. [New large-flowered hybrids of lily-of-the-valley.]** Rev. Hort. 93: 294–295. *1 pl. (colored).* 1921.—Many types of lily-of-the-valley, varying in size and form, and in color from white to rose, have been secured by crossing the several existing races. Two years are required for seed germination when grown in pots, and the seedlings bloom about 9 years after the crossing has been accomplished.—*E. J. Kraus.*

1791. RIVOIRE, A. **Quelques beaux Mimulus vivaces. [Some beautiful hardy Mimulus.]** Rev. Hort. 93: 355–356. *Fig. 90–92.* 1921.—Especially noteworthy forms are the species *Mimulus cupreus*, *M. cardinalis*, *M. luteus*, *M. rivularis*, *M. variegatus*, and *M. radicans*, and several varieties which have come from them.—*E. J. Kraus.*

1792. SIMONDS, O. G. **Landscape gardening.** *xii+338 p., 1 pl., 59 fig.* Macmillan Co.: New York, 1920.—This book treats of the aims of landscape gardening; saving of natural features and resources; planting materials; arrangement of planting; how to plant; water; home grounds; farms; landscape gardening for arid and semi-arid regions; public thoroughfares; the grounds of railway stations and rights of way; parks, forest preserves, city squares; golf grounds; school grounds; arboretums and botanic gardens; cemeteries; and city and regional plantings.—*J. H. Gourley.*

VEGETABLE CULTURE

1793. ANONYMOUS. **O feijão da Birmania. [The lima bean.]** Bol. Agric. [Nova Goa] 2: 22–24. 1920.—The lima bean (*Phaseolus lunatus*) gives promise as a crop for Portugaese India. Brief cultural directions are given.—*John A. Stevenson.*

1794. BAÑO, JOSÉ DE. **Tres tuberculos de importancia. [Three important roots.]** Rev. Agric. [Mexico] 5: 630–631. *3 fig.* 1921.—*Curcuma tinctoria*, *Maranta arundinacea*, and *Zingiber officinale* are described briefly, with cultural directions.—*John A. Stevenson.*

1795. DOMINGO, MIGUEL GIL. **Fertilización de las cebadas. [Onion fertilization.]** Información Agric. [Madrid] 10: 551–552. 1920.—Popular.—*John A. Stevenson.*

1796. HARTH, E. **Sortenanbauversuche mit Karotten im Jahre 1920. [Variety tests of carrots in 1920.]** Mitteil. Deutsch. Landw. Ges. 36: 459–462. 1921.—Results are given of tests with 2 late and 2 early varieties of carrot on various types of soil.—*A. J. Pieters.*

1797. KINMAN, C. F. **Yam culture in Porto Rico.** Porto Rico Agric. Exp. Sta. Bul. 27. *22 p., 6 pl.* 1921.—The yam (*Dioscorea* spp.), which ranks 2nd among root crops in Porto Rico, and is grown in nearly every family garden, gives certain yields since it is generally free from insect pests and diseases and is adaptable to practically all soil types. Very little attention has been given to improved cultural practices. Highest yields are obtained when plantings are made in ridges of loosened soil bringing the roots above the water line. Plants should be 1–2 feet apart in the ridges depending upon the variety. Either entire roots or portions may be planted, although crown sections give best results. Bordeaux mixture prevents decay of seed pieces. Pruning the vines reduces yields. Supports should always be provided. In experimental work, fertilizers did not give sufficiently increased yields to warrant their use. Of native varieties, Guinea is most satisfactory, giving heavy yields and

possessing high food value. Mapuey morado sells at a higher price but yields less. The experiment station has introduced other types, several of which are especially recommended. —*John A. Stevenson.*

1798. SANCHEZ, N. **El cultivo del ajo.** [Onion cultivation.] Jalisco Rural [Mexico] 3: 401–404. 1921.—Popular.—*John A. Stevenson.*

1799. VARELA, EFRÉN. **El cultivo del ajo en Tehuacan, Pueblo.** [Onion culture in Tehuacan.] Rev. Agric. [Mexico] 5: 697–699. *1 fig.* 1921.—Popular.—*John A. Stevenson.*

1800. VARGAS, LEANDRO M. **Cultivo de la sandia.** [Watermelon culture.] Rev. Agric. [Mexico] 5: 689–697. *7 fig.* 1921.—The author discusses watermelon culture under the general headings of varieties, soils, planting, cultivation, marketing, and enemies.—*John A. Stevenson.*

1801. VARGAS, LEANDRO M. **El melon.** [The melon.] Rev. Agric. [Mexico] 5: 742–750. *11 fig.* 1921.—This popular account of melon-growing in Mexico from planting to harvesting includes descriptions of the better varieties. Scab (*Cladosporium* sp.), anthracnose (*Colletotrichum lagenarium*), and wilt (*Bacillus* spp.) are the diseases to be guarded against.—*John A. Stevenson.*

HORTICULTURAL PRODUCTS

1802. ANONYMOUS. **Export of South African dried fruit. The regulations controlling the trade.** Jour. Dept. Agric. Union of South Africa 2: 536–540. 1921.

1803. ANONYMOUS. **Fabricación de la harina de plátano.** [Manufacture of banana flour.] Información Agric. [Madrid] 11: 244–246. 1921.—This is a popular account of the manufacture of banana flour.—*John A. Stevenson.*

1804. ANONYMOUS. **The pineapple canning industry.** South African Jour. Indust. 4: 410–417. *4 fig.* 1921.—An account is given of the process of canning pineapples at the Port Elisabeth factory. The fruit is grown at the Langholm Estates, Bathurst.—*E. M. Doidge.*

1805. ANONYMOUS. [Rev. of: WHYMPER, R. **Cocoa and chocolate; their chemistry and manufacture.** *2nd ed., xxi+568 p., 15 pl.* J. and A. Churchill: London, 1921.] Nature 107: 713. 1921.

1806. BAÑO, JOSÉ DE. **Elaboración de la pasa de higo.** [Preparation of dried figs.] Rev. Agric. [Mexico] 6: 210–212. *3 fig.* 1921.—This is a description of the methods used in California for drying figs.—*John A. Stevenson.*

1807. BURNS, WILLIAM, E P. G. JOSHI. **A secagem da banana.** [Banana drying.] Bol. Agric. [Nova Goa] 2: 62–69. 3 *fig.* 1920.—This article reports on experiments in drying bananas in Bombay.—*John A. Stevenson.*

1808. MAGAÑA, JUAN B. **Preparación de las aceitunas.** [Preparation of olives.] Rev. Agric. Tropic. [Salvador] 1: 15–19. 1921.—A brief description is given of methods of preparing olives and extracting olive oil.—*John A. Stevenson.*

1809. PIMENTAL, ARTURO. **Desecación de las ciruelas.** [Drying plums.] Bol. Ministerio Agric. Nación [Argentina] 26: 22–27. *6 fig.* 1921.—Popular.—*John A. Stevenson.*

1810. PRESTI, NICOLÁS. **Conservación de fruta fresca.** [Preservation of fresh fruit.] Bol. Agric. Provincia Buenos Aires 1^{16}: 7–12. *3 fig.* 1920.—The author discusses temperature, humidity, and light conditions to be maintained in fruit storage houses.—*John A. Stevenson.*

1811. PUIG, JUAN. **Estudios y observaciones sobre viti-vinicultura. [Studies in viticulture and wine-making.]** Inspeción Nacion. Ganaderia y Agric. [Uruguay] Bol. 38. *142 p., 14 fig.* 1920.—The author reviews the experimental work in grape-growing and wine-making carried on over a period of 5 years at the agronomical laboratory at Sayago, Uruguay. The results of chemical tests to determine density, acidity, and sugar content of the expressed juice and resulting wines from all available varieties for these years are tabulated. Studies were made of the time of ripening of the fruit of varieties under trial.—*John A. Stevenson.*

1812. TEVIS, MAY. **The attar of roses.** Sci. Amer. Monthly 3: 409–413. *9 fig.* 1921.—French and Bulgarian methods of producing the essential oil of rose petals are described.—*Chas. H. Otis.*

1813. TORRES, ANTONIO. **Aceite de los huesos de las aceitunas. [Oil from olive pits.]** Bol. Agric. Téc. y Econ. [España] 12: 676–680. 1920.

1814. TORRES, ANTONIO. **Aprovechamiento de los residuos de la fabricación de aceite de oliva. [Use of the residues from the manufacture of olive oil.]** Bol. Agric. Téc. y Econ. [España] 12: 420–432. 1920.—The residue remaining after the extraction of oil from olives can be utilized for manufacturing fertilizers, alcohol, and other products.—*John A. Stevenson.*

1815. WOLK, P. C. VAN DER. **Het fermenteeren van muskaat-noten. [Fermenting of nutmeg.]** Cultura 33: 255–259. 1921.—The fermentation of nutmegs before marketing is frequently mentioned in literature before 1860, but subsequently the practice was abandoned. After the mace and shells were removed, the fruits were dried, sorted, and placed in a brine of lime and sea water. The wet nuts were then placed in boxes and left up to 3 months, during which time fermentation took place. Finally the fruits were dried. The suggestion is made that this fermentation process should again be used as it is said to improve the quality of the nuts.—*J. C. Th. Uphof.*

MORPHOLOGY, ANATOMY AND HISTOLOGY OF VASCULAR PLANTS

E. W. SINNOTT, *Editor*

(See also in this issue Entries 1463, 1489, 1602, 1678, 1681, 1682, 1872, 1874, 1940, 2000)

1816. ARBER, AGNES. **The leaf structure of the Iridaceae considered in relation to the phyllode theory.** Ann. Botany 35: 301–336. *66 fig.* 1921.—The theory that the monocotyledonous leaf is morphologically a phyllode is applied to the various types found in the Iridaceae. The ensiform (equitant isobilateral) type is shown to be similar in many respects (even in its occasional association with a winged axis) to the phyllodes of *Acacia*. It is regarded as a petiolar phyllode and not the result of congenital concrescence as stated by other authors. The "radial" types found in certain species are shown to be variants on the ensiform type. The dorsiventral type with cylindrical apex is regarded as a leaf-base phyllode terminating in a more or less vestigial petiole, while the type which is dorsiventral to the extreme tip is regarded as entirely leaf base. The peculiar foliated types of *Babiana*, *Cypella*, etc., are shown to arise from a simple petiolar structure through invaginations sometimes associated with the development of keels or wings. The leaves of Crocoideae are also interpreted as petiolar phyllodes, the divergent types being due to different forms of invagination. The general course of evolution of the leaf of this family is discussed and it is concluded that the ensiform type is primitive for the family and that the other types have been derived from it either by the reduction of the petiolar region, or by the elaboration of this region through winging or invagination.—*W. P. Thompson.*

1817. BETTS, M. WINIFRED. **Notes from the Canterbury College Mountain Biological Station, Cass. No. 7.—The rosette plants Part I.** Trans and Proc. New Zealand Inst. 52: 253–275. *36 fig.* 1920.—This paper gives a list of the indigenous rosette plants, numbering

23 forms, found in the neighborhood of the station. The present paper treats only part of these. Details of the general morphology and histology of root, stem, and leaf are given for the following plants: *Geum parviflorum* Sm., *Cardamine heterophylla* (Forst. f.) O. E. Schulz (var.), *Plantago triandra* Berggr., *Brachycome Sinclairii* Hook. f., *Gnaphalium Traversii* Hook. f.—*Wm. Randolph Taylor.*

1818. BETTS, M. WINIFRED. **Notes on the autecology of certain plants of the Peridotite Belt, Nelson: Part I—Structure of some of the plants (No. 3).** Trans. and Proc. New Zealand Inst. 52: 276–314. *48 fig.* 1920.—A continuation of a series of detailed descriptions of the habit and the histology of the leaves and stems of plants of the Peridotite Belt. The following species and varieties are considered in this paper: *Cyathodes acerosa* R. Br., *Gentiana corymbifera* T. Kirk., *Myosotis Monroi* Cheesm., *Euphrasia Monroi* Hook. f., *Wahlenbergia albomarginata* Hook., *Celmisia longifolia* Cass. var. *gracilenta* T. Kirk., *Olearia virgata* Hook. f., *Helichrysum bellidioides* Hook. f., *Cassinia Vauvilliersii* Hook. f. var. *rubra* Buch., *Senecio bellidioides* Hook. f., *Gahnia procera* Forst., *Astelia montana* (T. Kirk) Cockayne, *Dianella intermedia* Endl., *Libertia ixioides* Spreng.—*Wm. Randolph Taylor.*

1819. BLOCK, MME. E. **Modifications des racines et des tiges par action mécanique. [Modifications of roots and stems by mechanical action.]** Compt. Rend. Acad. Sci. Paris 172: 1524–1526. *Fig. 1–6.* 1921.—Roots of radish and sweet pea and stems of black nightshade and buckwheat were studied. A portion of each was enclosed in a glass tube or between glass plates, the remaining portions of the plant meanwhile continuing their development under normal conditions. Development takes place above and below the encasement in all instances. In stems, an enlargement or pad is formed above the encasement. Stems of *Impatiens parviflora* form rootlets just below the encasement, but in *Helianthus annuus* just above this region. No suberized phelloderm is formed beneath the glass as it is above and below and in the controls. Root development above and below the encasement is normal. —*C. H. Farr.*

1820. BÖÖS, GEORG. **Ueber die Natur einer gewissen Blütenanomalie bei Ranunculus acris L. [The nature of a flower anomaly in Ranunculus acris.]** Bot. Notiser 1920: 151–154. *Fig. 1–11.* 1920.—The author describes some anomalous flowers of *Ranunculus acris* found at the botanic museum at Lund. The petals, stamens, and pistils had more or less reverted into phyllomes. The petals were about half as long as in normal flowers, more or less 3-lobed at the apex, yellowish green in the center like the sepals, pure yellow only along the margins, without a nectary at the base, and hairy instead of glabrous on the back; the filaments were more or less flattened and hairy; the anthers flat and containing less pollen than the normal ones; the pistils hairy, not keeled on the upper margin, but mostly open, and without ovules. —*P. A. Rydberg.*

1821. BROWNE, ISABEL M. P. **A fourth contribution to our knowledge of the anatomy of the cone and fertile stem of Equisetum.** Ann. Botany 35: 428–456. *Pl. 21, 12 fig.* 1921.—The vascular systems of the cones of *E. sylvaticum*, *E. debile*, and *E. variegatum* are described in detail. That of *E. debile* is much reduced and forms an irregular loose network. Numerous parenchymatous meshes originating below the cone persist for a considerable distance into the cone or throughout its full length. The stele of *E. variegatum* is also somewhat reduced. The separation of the protoxylem and metaxylem in the internodes of certain species is regarded as a derivative character due to reduction. A comparative study confirms the view that the meshes arose at points vertically above the sporangiophoric traces, though at a certain height above this level. In certain cases the approximation of the meshes to the point of the departure of the traces is due to reduction of the xylem during phylogeny. The meshes are therefore not true gaps. Evidence is adduced in support of the view that the insertion of the annulus marks the position of a vestigial node.—*W. P. Thompson.*

1822. CUTTING, E. M. **Observations on variations in the flowers of Stachys sylvatica Linn.** Ann. Botany 35: 409–426. *6 fig.* 1921.—Plants of *Stachys sylvatica* were observed showing

many variations such as peloria, semi-peloria, fasciations, synanthy, increase and reduction in the number of parts of all 4 whorls, abortion of stamens, etc. Early in the year the tendencies exhibited are toward an increase in the number of parts, especially in the androecium and gynoecium, and toward fasciation. Such variations are usually found in the middle flowers. In the autumn the commonest variation is a bifurcation in the upper lip of the corolla, and specimens showing this are fewer in warm, sunny situations. In the autumn also the abortion of stamens is commonest, and this is accompanied by a marked decrease in the size of calyx and corolla, the side flowers withering without opening. Throughout the year flowers with a reduced number of parts in the corolla are common.—*W. P. Thompson.*

1823. DUSÉN, P., UND F. W. NEGER. **Über Xylopodien. [Xylopodia.]** Beih. Bot. Centralbl. 38: 258–317. *Pl. 10, 20 fig.* 1921.—In 1900 Lindman described as "xylopodia" the hard tuberous thickenings of the underground parts of the shrubby and dwarfed plants of the steppes of southern Brazil. Many plants possess these structures. Many xylopodia are described as to characteristics of the bark, structure of the woody parts, and presence of reserve material and other contents. The xylopodium is root as often as stem, often root in one species and stem (rhizome) in another in the same family and even in the same genus. The parenchyma is remarkably developed. The unusual hardness is due to: (1) Hard bark, 1–2 mm. thick, of thickwalled stone cells; (2) cell walls of the parenchyma more or less silicified; (3) inorganic substances such as calcium oxalate or calcium carbonate. The arrangement of the tissues is rather regularly radial in the larger xylopodia, but in the more nearly oval ones it is not always easy to distinguish between longitudinal, tangential, and cross sections. These oval ones also have fewer and smaller bundles. Growth rings appear in some, but it is not known whether these are annual rings. The few xylopodia known in Europe do not differ essentially from the Brazilian forms so far as investigated.—*L. Pace.*

1824. FEUSTEL, NERM. **Anatomie and Biologie der Gymnospermblätter. [Anatomy and biology of gymnosperm leaves.]** Beih. Bot. Centralbl. 38: 177–257. 1921.—A review and discussion is presented of the literature on this subject. The Pteridosperms (Cycadofilices), Cycadales, Bennettitales, Cordaitales, Ginkgoales, families of the Coniferales, and Gnetales are considered, the epidermis, stomata, hypodermis, mesophyll, secretory system, vascular bundle, transfusion tissue, rhachis, and bundle trace being discussed.—*L. Pace.*

1825. HOFMEYR, JOAN. **A note on the germination of the seed of Elephantorrhiza Burchellii.** South African Jour. Nat. Hist. 3: 215–216. 1921.—A hollow cotyledonary tube carries the plumule and radicle down into the soil. The plumule develops within this cotyledonary tube and eventually pierces the wall, the resulting shoot coming above the ground. Throughout the germination the cotyledons remain below the ground and function as a storehouse upon which the developing seedling draws for its nourishment.—*E. P. Phillips.*

1826. HOLLOWAY, J. E. **Studies in the New Zealand species of the genus Lycopodium: Part IV.—The structure of the prothallus in five species.** Trans. and Proc. New Zealand Inst. 52: 193–239. *Pl. 12–15, 75 fig.* 1920.—The species described are *L. Billardieri* Spring, *L. Billardieri gracile* T. Kirk, and *L. varium* R. Br. Prodr. of the section *Phlegmaria;* and *L. cernuum* L., *L. laterale* R. Br. Prodr., and *L. ramulosum* T. Kirk of the section *Cernua.* The species of the former section are very similar in general shape. The central body, more or less elongated, bears a number of adventitious branches. In the main body the fungal symbiont is present throughout the older portion, though more scattered forward. The tips of the branches and the forward end of the central body are free from fungus. This latter is the main generative region and bears paraphyses, antheridia, and archegonia. In the section *Cernua, L. cernuum* and *L. laterale* are very similar. The prothallus consists of a basal "primary tubercle" supporting a shaft which terminates above in a crown of lobes beneath which lies the meristem and the sexual organs. The prothallus grows at the surface of the ground and has green lobes and a radial structure. The fungus is present in the primary tubercle and in lateral extensions from this area, or sometimes in a second swelling part way up the shaft. The prothallus of *L. ramulosum* varies greatly, however. The structure of all 5 species is described in detail.—*Wm. Randolph Taylor.*

1827. LANGDON, LADEMA M. **Storied structure of dicotyledonous woods.** [Rev. of: RECORD, S. J. **Storied or tierlike structures of certain dicotyledonous woods.** Bull. Torrey Bot. Club 46: 253–273. 1919 (see Bot. Absts. 3, Entry 2442).] Bot. Gaz. 69: 270. 1920.

1828. LANSDELL, K. A. **Weeds of South Africa. I., II. and III.** Jour. Dept. Agric. Union of South Africa 2: 315–321. *Fig. 1–11*; 2: 541–551; 3: 172–177. *Fig. 12–59.* 1921.—General descriptions and illustrations are given of the morphology of flowers, fruits, and leaves of South African weeds.—*E. M. Doidge.*

1829. PUJIULA, J. **Contribución al conocimiento anatómicofisiológico de los zarcillos de la zarzaparrilla (Smilax aspera). [Contribution to the knowledge of the anatomy and physiology of the tendrils of Smilax aspera.]** Brotéria Sér. Bot. 19: 66–72. *Fig. 1.* 1921.—Contact irritability in the tendrils of *Smilax aspera* seems a general function of the epidermal cells, no special correlated structures being visible in microscopic sections. Such sections, however, show great and irregular thickenings of the transverse cell walls, the lumen at times being wholly filled; this is true even of the guard cells of stomata with an apparent loss of function. The author concludes that the thickening is in response to mechanical stresses after the tendril has secured support, and that coincidentally ability to respond to stimulation is lost.—*E. B. Chamberlain.*

1830. SHOWALTER, A. M. **An orthotropous ovule in Hyacinthus orientalis L.** Torreya 21: 62–63. *Fig. 1–2.* 1921.—An ovule in the upper part of an ovary was found to be orthotropous instead of anatropous, but typical in all other respects. In the median portion of the ovary the carpels seemed to be imperfectly fused and the placentas slightly displaced.—*J. C. Nelson.*

1831. SUESSENGUTH, KARL. **Beiträge zur Frage des systematischen Anschlusses der Monokotylen. [Contributions to the systematic relationships of the monocotyledons.]** Beih. Bot. Centralbl. 38: 1–79. *Fig. 1–18.* 1921.—The following criteria are considered important in deciding the relationships of the monocotyledons: (1) Microspore development, periplasmodium; (2) development and structure of the embryo-sac and young ovules; (3) endosperm and perisperm; (4) embryo; (5) flower structure; (6) bundle structure and arrangement and cambium; (7) leaf structure; (8) root structure; (9) serum reaction.—After the heterotypic division in monocots, the daughter cells develop walls, whereas in dicotyledons walls appear only after the 4 nuclei are formed. These are known respectively as the successive and simultaneous methods of pollen formation. The latter is phylogenetically the older as it is found in Gymnosperms and commonly in pteridophytes and mosses. The embryo sac and megaspore do not seem to furnish any distinctive characters for either group. Besides a comparison of those already investigated, the author studied *Dioscorea, Tacca, Cyperus, Hydrocleis* with normal sacs, and *Chamoedorea* with a 4-nucleate sac. Most monocotyledons and many of the choripetalous and some of the sympetalous dicotyledons have endosperm showing free simultaneous division,—Palm's "nuklearem" type. Monocotyledony is considered as ecologically induced. The flower structure is probably the most important reason for regarding the group as monophyletic.—*L. Pace.*

1832. THODAY, MARY G. **Ripening of seed in Gnetum gnemon and Gnetum africanum.** South African Jour. Sci. 17: 189–192. *2 fig.* 1921.—The structure of the mature seed is of interest ontogenetically in showing a method of closing the pollinated ovule of a gymnosperm. It is also of importance in connection with the comparison made between the seeds of the Gnetales and those of the Bennettitales.—*E. P. Phillips.*

1833. WAGER, H. A. **The leaves of Hakea pectinata and H. suaveolens.** South African Jour. Sci. 17: 284–286. *2 fig.* 1921.—The leaf of the former species has probably evolved on xerophytic lines from a flat, more expanded, and delicate type. The latter species still shows xerophytic characters, such as toughness, thick cuticle, and sunken stomata. This is considered as a case of reversion in that the type of leaf found in *H. suaveolens* has evolved from that of *H. pectinata.*—*E. P. Phillips.*

1834. WELLS, B. W. **A phenomenal shoot.** Jour. Elisha Mitchell Sci. Soc. 36: 15. 1920.—A shoot of *Pawlonia tomentosa* is recorded as reaching in 1 year a height of 19 feet 5 inches and a diameter of 2 feet 5 inches.—*W. C. Coker.*

1835. WRIGHT, GERTRUDE. **Pit-closing membrane in Ophioglossaceae.** Bot. Gaz. 69: 237–247. *2 pl., 6 fig.* 1920.—The only torus found among the cryptogams was in *Botrychium* and *Helminthostachys*, forms in which pits are circular, broad-bordered, and round-pored. *Ophioglossum* has a uniform membrane, as is the case in *Isoetes, Psilotum, Equisetum,* and *Pteris*, although both Strasburger and DeBary claimed that there is a torus in *Pteris*. The form of the torus in *Botrychium* and *Helminthostachys* resembles closely the type found in the lower gymnosperms, *Ginkgo*, and the araucarians.—*H. C. Cowles.*

MORPHOLOGY AND TAXONOMY OF ALGAE

E. N. TRANSEAU, *Editor*
L. H. TIFFANY, *Assistant Editor*

(See in this issue Entry 1937)

MORPHOLOGY AND TAXONOMY OF BRYOPHYTES

ALEXANDER W. EVANS, *Editor*

(See also in this issue Entries 1533, 1535, 1967, 1968, 2058, 2066)

1836. CHAMBERLAIN, EDWARD B. **A catalogue of Portuguese mosses.** [Rev. of: MACHADO, ANTONIO. **Catálogo descritivo de briologia portuguesa. (Descriptive catalogue of Portuguese mosses.)** *143 p.* Lisbon, 1919 (see Bot. Absts. 8, Entry 1266).] Bryologist 24: 44–46. 1921.—The reviewer sums up the work upon Portuguese bryophytes previous to the list at hand and outlines the scope of Machado's work, commending the careful citation of geographic distribution and the lack of "new species" but criticising the nomenclatorial changes. A list of the proposed new combinations follows, and there is an attempt at correcting certain of the typographic and other errors.—*E. B. Chamberlain.*

1837. DIXON, H. N. **Miscellanea bryologica—VII.** Jour. Botany 59: 132–139. 1921.—The 6th number of this series has already been abstracted (see Bot. Absts. 3, Entry 701). In the present number *Hypnum replicatum* Hampe of Ceylon is first considered and is referred to the genus *Sematophyllum*, under the name *S. replicatum* (Hampe) comb. nov., *S. pilotrichelloides* Card. & Dixon being included among its synonyms. Critical or distributional notes on the following species are then given: *Rigodium dentatum* Dixon, erroneously recorded from Transvaal but really based on Cape Town material; *Eurhynchium meridionale* De Not., *Tortula inermis* (Brid.) Mont., *Didymodon riparius* (Aust.) Kindb., *Discelium nudum* Brid., and a peculiar form of *Dicranum fuscescens* Turn., all of which are reported from localities in the British Isles; *Ectropothecium australe* Jaeg. of Campbell Island, the proper name of which is said to be *Isopterygium limatum* (Hook. f. & Tayl.) Broth.; *Barbula apoclada* Par. of Argentina, which should be known as *B. perrevoluta* C. M.; *Schwetschkea usambarica* Broth. of East Africa; *Myurium Foxworthyii* Broth. of the Philippine Islands; *Fontinalis antipyretica* L., reported for the first time from South Africa; *Hypnum secundifolium* C. M. of Cape Horn, which is referred to the genus *Drepanocladus*, under the name *D. secundifolius* (C. M.) comb. nov.; *Neckera glossophylla* Mitt. of India, which is reduced to synonymy under *Homaliodendron microdendron* (Mont.) Fleisch.; *Pinnatella elegantissima* (Mitt.) Fleisch. of the East Indies and Oceanica, which is regarded as a synonym of *P. Kuhliana* (Bry. jav.) Fleisch.; and *Gymnostomum oranicum* Rehm. of South Africa, the correct name of which is said to be *Weisia oranica* (Rehm.) C. M.—*A. W. Evans.*

1838. DOUIN, CH. **La famille des Céphaloziellacées. [The family Cephaloziellaceae.]** Mém. Soc. Bot. France 63[2]: 1–90. *Pl. 1–9.* 1920.—The Cephaloziellaceae represent a group

of minute leafy hepatics with bilobed leaves. It is based on the old genera *Dichiton*, *Cephaloziella*, and *Prionolobus*, but the author segregates from *Cephaloziella* the genera *Lophoziella*, *Evansia*, and *Protocephaloziella*, all of which he had characterized in an earlier article. The present work is divided into a general and a special part. In the former he discusses the characters of the family and attaches especial importance to those drawn from the sporophyte, such as the arrangement of cells in the pedicel and the histological features of the capsule-valves. He shows also that the group is amply distinct from *Cephalozia* and its allies, with which *Cephaloziella* and *Prionolobus* were previously associated. The 6 genera which he recognizes he bases largely on characters derived from the gemmae and involucral leaves, and he insists on the importance of definite morphological characters in distinguishing the species. In the special part he gives detailed keys to the genera, species, subspecies, and varieties of the entire world, assigning 1 species to *Dichiton*, 2 to *Lophoziella*, 3 to *Prionolobus*, 4 to *Evansia*, 1 to *Protocephaloziella*, and 55 to *Cephaloziella*. The following new species are proposed, Douin being the authority unless otherwise noted: *Cephaloziella alpina* (Northern Hemisphere), *C. antarctica* (antarctic region), *C. arvernensis* (France), *C. Brinkmanni* (North America), *C. cibulkensis* (Bohemia and the Adriatic region), *C. gallica* (France), *C. Holzingeri* (North America), *C. hyalina* (Florida), *C. inaequiloba* Schiffn. (Himalayas), *C. Levieri* Schiffn. (Tasmania), *C. norvegica* (Norway), *C. pentagona* (Africa, Japan, and Oceanica), *C. Rappii* (Florida), and *C. Stephanii* Schiffn. (Java). At least 2 of these species have already been published without descriptions, but the list does not include several other species designated as new, owing to the fact that Douin has briefly characterized them in earlier works. The following new subspecies are likewise proposed: *C. glacialis* (Europe) and *C. Lorenziana* (U. S. A.) under *C. alpina; C. turfacea* (Austria) under *C. rubella* (Nees) Warnst.; *C. carnutensis* (France), *C. nigrimonasteriensis* (France), and *C. scabrifolia* Douin & Schiffn. (U. S. A.) under *C. Starkii* (Funck) Schiffn.; *C. angustiloba* (U. S. A.) and *C. spinosa* (Sweden) under *C. striatula* (C. Jens.) Douin. There are in addition many new combinations, necessitated by the transference of species or by their reduction to subspecific or varietal rank. In the following list only the new specific combinations are given: *C. arenaria* (Steph.), *C. capillaris* (Steph.), *C. hirta* (Steph.), *C. Kiaeri* (Aust.), *C. minima* (Aust.), *C. patulifolia* (Steph.), *C. Pearsoni* (Spruce), *C. Spegazziniana* (Massal.), *C. subbipartita* (Massal.), *C. subtilis* (Lindenb. & Gottsche), *C. Welwitchsii* (Steph.), and *Lophoziella rhizantha* (Mont.).—*A. W. Evans.*

1839. LESAGE, PIERRE. **Cultures expérimentales du Fegatella conica et de quelques autres muscinées. [Experimental cultures of Fegatella conica and of some other bryophytes.]** Compt. Rend. Acad. Sci. Paris **172**: 1521–1523. 1921.—This paper presents a continuation of studies previously reported. Three forms of *Fegatella conica* were found growing in the greenhouse under different environmental conditions. They may be converted one into the other by altering the conditions.—*C. H. Farr.*

1840. LUISIER, A. **Les mousses de Madère. [Mosses of Madeira.]** Brotéria Sér. Bot. **19**: 73–96. 1921.—A continuation of a series of articles (see Bot. Absts. 9, Entry 1506). The present installment contains keys to the acrocarpous genera from *Tortula* (pars) to *Webera*. The whole moss flora of the Atlantic Islands is being covered.—*E. B. Chamberlain.*

1841. MEYLAN, CH. **Nouvelles contributions à la flore bryologique du Jura. [New contributions to the moss flora of the Jura Mountains.]** Rev. Bryologique **48**: 1–5. 1921.—The author records the results of his exploration in the Jura Mountains since 1919. Thirty species of mosses are listed with full data regarding localities and, in several cases, with critical observations. Of the species included, *Pohlia pulchella* (Hedw.) Lindb. represents an addition to the Swiss flora, *Eurhynchium Stokesii* (Turn.) Br. & Sch. is definitely recorded for the 1st time from Switzerland, and 4 others represent additions to the flora of the Jura region. Under *Thuidium abietinum* (L.) Br. & Sch. a new variety *paludosum* is proposed and *Th. hystricosum* Mitt. is reduced to varietal rank.—*A. W. Evans.*

1842. Meylan, Ch. **Une nouvelle variété de Scorpidium scorpioides.** [**A new variety of Scorpidium scorpioides.**] Rev. Bryologique 48: 5. 1921.—The new variety bears the name *cuspidatum* and is based on specimens collected by Rohrer on the island of Reichenau in Lake Constance, Baden.—*A. W. Evans.*

1843. Potier de la Varde, R. **Hildenbrandtiella Soulii Broth. et P. de la V. (sp. nov. usambarica).** Rev. Bryologique 48: 9–11. *7 fig.* 1921.—Under the above name the author describes and figures a new moss collected by J. Soul at Kinvani in the district of Usambara, Tanganyka Territory, Africa. At the close of the paper he lists 7 other mosses from the same region.—*A. W. Evans.*

1844. Potier de la Varde, R. **Observations sur quelques espèces du genre Fissidens.** [**Observations on certain species of the genus Fissidens.**] Rev. Bryologique 48: 5–9. *3 fig.* 1921.—The earlier parts of this article have already been abstracted (see Bot. Absts. 5, Entry 628; 6, Entry 158; 7, Entry 1975). In the present installment *Fissidens Mildeanus* Schimp. is discussed, the author's observations being largely based on material which he collected in the department of the Manche, France. This material grew along the banks of brooks in localities which are submerged except in unusually dry seasons; 4 other mosses and 2 hepatics from similar stations are listed. In connection with the Fissidens the propagula are described and figured, the idea being advanced that they are homologous with axillary hairs and rhizoids.—*A. W. Evans.*

1845. Potier de la Varde, R. **Une correction au nom de Weisia viridula Brid. var. longifolia Thér. et P. de la V.** [**A correction of the name Weisia viridula var. longifolia.**] Rev. Bryologique 48: 11. 1921.—The Weisia here alluded to was described in an earlier paper by the author on African mosses (see Bot. Absts. 9, Entry 347). A change of name is necessitated on account of an earlier var. *longifolia* Broth. & Wager, and the new varietal name *macrophylla* Thér. et P. de la V. is proposed.—*A. W. Evans.*

1846. Thériot, I. **Considérations sur la flore bryologique de la Nouvelle-Calédonie et diagnoses d'espèces nouvelles.** [**Remarks on the bryological flora of New Caledonia and diagnoses of new species.**] Rev. Bryologique 48: 11–16. 1921.—The introductory portion of this paper on the mosses of New Caledonia has already been abstracted (see Bot. Absts. 10, Entry 611). In the present installment 12 species are enumerated and discussed, with full data regarding localities. Three new varieties and the following new species are proposed, Thériot being the authority except where otherwise indicated: *Barbula Franci*, *Calymperes Franci*, *Dicranoloma confusum*, *Dicranum dubium* Thér. & Dixon, *Fissidens humicolus*, *F. latinervis*, and *Trichostomum laticostatum*. Four of these new species were based on specimens collected by I. Franc.—*A. W. Evans.*

MORPHOLOGY AND TAXONOMY OF FUNGI, LICHENS, BACTERIA, AND MYXOMYCETES

H. M. Fitzpatrick, *Editor*

(See in this issue Entries 1752, 1861, 1870, 1876, 1877, 1956 and those in the Section Pathology)

PALEOBOTANY AND EVOLUTIONARY HISTORY

Edward W. Berry, *Editor*

(See also in this issue Entries 1831, 1832)

1847. Carpentier, A. **Découverte d'une flore wealdienne dans les environs d'Avesnes (Nord).** [**The discovery of a Wealden flora in the vicinity of Avesnes.**] Compt. Rend. Acad. Sci. Paris 172: 1428–1429. 1921.—A number of species were found near Avesnes in France

which are characteristic of the Wealden flora (Lower Cretaceous) of Europe. An especially large number of Coniferales and ferns are reported.—*C. H. Farr.*

1848. Chandler, M. E. J. **Note on the occurrence of Sequoia in the Headon beds of Hordwell, Hants.** Ann. Botany 35: 457. 1921.—Well preserved material consisting of twigs, leaves, cones, and seeds of *Arthrotaxis Couttsiae* Starkie Gardner, were found in Gardner's original locality at Hordwell, Hants. They proved on careful examination to be *Sequoia*, as most paleobotanists except Starkie Gardner have always considered them.—*W. P. Thompson.*

1849 Church, A. H. **The lichen life cycle.** Jour. Botany 59: 139–145, 164–170, 197–202, 216–221.. 1921.—Through a detailed comparison with Laboulbeniaceae and Florideae, the author comes to the conclusion that the lichen fungi represent relics of a distinct race, derived from marine ancestors, "but presenting while still in the sea a somatic organization of high grade, fully complementary to the advanced conditions of their reproductive mechanism and life-cycle. . . . In pool formations of standing water, these heterotrophic survivors have picked up intrusive algae, to recover vicariously photosynthetic relations with the free atmosphere." Through the periodic or permanent drying up of these pools, the xerophytic condition we now know was attained.—*Adele Lewis Grant.*

1850. Menzel, P. **Über hessische fossile Pflanzenreste.[On fossil plants from Hesse.]** Jahrb. Preuss. Geol. Landes. 41¹: 340–391. *Pl. 14–18.* 1921.—Small Tertiary florules from eight different localities in Hesse are described. The following forms are new: *Cyclobalanopsis gracilis, Styrax blanckenhornii, Laurophyllum apolloniaceum, Viburnum schultzii, Leguminosites vicioides, Phyllites knemaeformis, Carpolithes circumcinctus.*—*E. W. Berry.*

1851. Potonié, R. **Der mikrochemische nachweis fossiler kutinisierter und verholzter Zellwände sowie fossiler Zellulose und seine Bedeutung für die Geologie der Kohle. [Microchemical test for cutinization and lignification of the cell wall, also fossil cellulose and their bearing on the geology of coal.]** Jahrb. Preuss. Geol. Landes. 41¹: 132–188. *Fig. 2.* 1920.

PATHOLOGY

G. H. Coons, *Editor*

C. W. Bennett, *Assistant Editor*

(See also in this issue Entries 1448, 1456, 1462, 1469, 1508, 1509, 1520, 1523, 1642, 1687, 1696, 1704, 1752, 1771, 1801, 1964, 1966, 1971, 1973, 1974)

PLANT DISEASE SURVEY: REPORTS OF DISEASE OCCURRENCE AND SEVERITY

1852. Anonymous. **The "Fiji disease" of sugar-cane.** Jour. Dept. Agric. Union of South Africa 2: 554–556. 1921.—This is a general account of the occurrence of this disease in Fiji, New Guinea, and Hawaii, and of the symptoms and cause so far as they are at present known.—*E. M. Doidge.*

1853. Bijl, Paul A. van der. **A paw-paw leaf spot caused by a Phyllosticta sp.** South African Jour. Sci. 17: 288–290. 1921.—A leaf spot, or shot hole, disease of pawpaws is here described which is said to be caused by *Phyllosticta caricae-papayae.*—*E. M. Doidge.*

1854. Bruner, S. C. **Informe sobre enfermedades del cafeto. [Coffee diseases.]** Informe An. Estac. Exp. Agron. [Cuba] 1918–20: 628–632. *2 fig.* 1920.—Three coffee diseases have been found in Cuba, thread blight (*Pellicularia koleroga*), and 2 leaf spots, due respectively to *Stilbella flavida* and *Cercospora coffeicola.* The symptoms of these diseases are given and control measures outlined.—*John A. Stevenson.*

1855. BRUNER, S. C. **La pudrición negra del cacao.** [Black rot of cacao.] Informe An. Estac. Exp. Agron. [Cuba] 1918–20: 627–628. *1 fig.* 1920.—The black rot disease of cacao due to *Phytophthora faberi* has been found in Cuba. Symptoms of the disease are briefly described.—*John A. Stevenson.*

1856. BRUNER, S. C. **Lista preliminar de las enfermedades de las plantas de importancia economica para Cuba.** [Preliminary list of the diseases of economic plants of Cuba.] Informe An. Estac. Exp. Agron. [Cuba] 1918–20: 723–755. *47 fig.* 1920.—A list is presented of the diseases of economic plants of Cuba with brief descriptive notes as to symptoms and occurrence.—*John A. Stevenson.*

1857. DOIDGE, E. M. **Crown gall. Bacterium tumefaciens Smith and Townsend.** Jour. Dept. Agric. Union of South Africa 3: 64–67. *1 fig.* 1921.—This is a popular account of the occurrence of crown gall in South Africa.—*E. M. Doidge.*

1858. FAWCETT, G. L. **Enfermedad del cacao.** [Cacao disease.] Rev. Indust. y Agric. Tucuman 10: 52–54. 1920.—A disease of cacao reported from Ecuador is apparently due to *Phytophthora faberi.* Symptoms and recommended treatment are outlined.—*John A.* Stevenson.

1859. FAWCETT, G. L. **La verruga o "scab" de los citrus.** [Citrus scab.] Rev. Indust. y Agric. Tucuman 10: 124–128. *3 fig.* 1920.—Citrus scab, caused by *Cladosporium citri*, made its first appearance in Tucuman in 1918–19. The disease has also been reported from Paraguay by Spegazzini. The symptoms of the disease and control measures are discussed. The grapefruit is severely attacked.—*John A. Stevenson.*

1860. FROMME, F. D. **Wildfire and angular spot.** Rhodesia Agric. Jour. 18: 411–414. 1921.—This is evidently a reprint and is preceded by a note by H. W. TAYLOR to the effect that both diseases occur in Rhodesia.—*E. M. Doidge.*

1861. MIURI, M. **Diseases of important economic plants in Manchuria.** [In Japanese.] Bull. South Manchuria Railway Company Agric. Exp. Sta. [Kun-chu-ling, Manchuria] 21. *56 p., 8 fig.* 1921.—Brief descriptions of the cause, symptoms, and control of the diseases of soybean, sorghum, maize, and Italian millet are given. (1) On soybean, bacterial blight (*Bacterium sojae* Tisdale?), downy mildew (*Peronospora trifolium* var. *manshurica* Naoum.), sclerotinia rot (*Sclerotinia libertiana*), ring spot (*Fusarium* sp.), silk rot (*Hypochnus centrifugus*), rust (*Uromyces sojae*), gray spot (*Pleosphaerulina sojaecola* (Massl.) Miura nov. nom.), brown spot (*Septoria glycines*), leaf spot (*Cercospora daizu* M. Miura n. sp.), yellows (*Heterodera schachtii*), soil sickness, and dodder (*Cuscuta chinensis*); (2) on sorghum, stalk rot (*Pythium debaryanum*), head smut (*Sphacelotheca reiliana*), grain smut (*Sphacelotheca sorghi*), leaf spot (**Ramulispora** *andrapogonis* Miuri n.g. et n. sp.); (3) on maize, stalk rot (*Pythium debaryanum*), head smut (*Sphacelotheca*), smut (*Ustilago zeae*); (4) on Italian millet, downy mildew (*Sclerospora graminicola*), smut (*Ustilago crameri*), rust (*Uromyces setariae-italicae*), damping-off (*Fusarium* sp.). The new genus and the new species are fully described and figured.—*S. Hori.*

1862. PUTTERILL, V. A. **Plant diseases in the Western Province.** Jour. Dept. Agric. Union of South Africa 2: 525–532. *4 fig.* 1921.—Chlorosis in Kelsey plums at Wellington in the Cape Province appears to be due to a general lack of plant foods and humus in the soil. Notes are also given on Lithiiasis in pears, chrysanthemum rust (*Puccinia chrysanthemi*), and a storage rot of soft fruits caused by *Rhizopus nigricans.*—*E. M. Doidge.*

1863. RAMIRÉZ, ROMÁN. **Cyathus de la vid.** [A Cyathus on grape.] Rev. Agric. [Mexico] 5: 720. 1921.—*Cyathus* sp. is mentioned.—*J. A. Stevenson.*

1864. RAMIRÉZ, ROMAN. **Enfermedad de las dahlias.** [A dahlia disease.] Rev. Agric. [Mexico] 6: 100. 1921.—*Oidium* sp. is mentioned.—*J. A. Stevenson.*

1865. Ritzema Bos, J. **Trametes Pini Brot. (Fr.) een voor de dennen hoogst gevaarlijke zwam, thans ook in Nederland aangetroffen. [Trametes pini, a fungus very dangerous to the fir, now present in Holland.]** Tijdschr. Plantenz. 26: 189–192. 1920.—The author records the recent discovery of this fungus in Holland and describes the character of the injury to the host.—*H. H. Whetzel.*

1866. Schoevers, T. A. C. **Nieuwe ziekten, waarop gelet moet worden. [New diseases to which attention should be given.]** Tijdschr. 'Plantenz. 26: 208–211. 1920.—The discovery in Holland of the disease of beans caused by *Isariopsis griseola* is recorded.—*H. H. Whetzel.*

1867. South, F. W. **Short report on the work of the inspection staff, second half-year, 1920.** Agric. Bull. Federated Malay States 8: 256–258. 1920 [1921].—During the dry weather of the 3rd quarter of 1920 moldy-rot disease on the rubber tree (*Sphaeronema fimbriatum*) became less abundant and in some places disappeared. A dying-back of the edge of the tapping cut on trees of *Hevea brasiliensis*, as well as a decay of the renewing bark, of obscure cause, was observed. *Ustulina zonata* was observed on *Areca catechu.*—*I. H. Burkill.*

THE PATHOGENE (BIOLOGY; INFECTION PHENOMENA; DISPERSAL)

1868. Büsgen, M. **Omnivorie und Spezialisation bei parasitischen Pilzen. [Omnivorousness and specialization among parasitic fungi.]** Zeitschr. Forst- u. Jagdw. 51: 144–153. 1919. —Specialization by parasites is said to be the resultant of the individual capability of the parasite and the nature of the host plant. It is first manifested in the ability of the fungus to penetrate the cell-wall, which offers the first resistance. *Botrytis vulgaris*, a very important destroyer of forest trees, decomposes cellulose readily, but it is limited as to its ability to break down the cell structure of various plants. Once it breaks through the cell structure it is omnivorous. The poison from the fungus, which is not oxalic acid, brings about loss of turgor, and death, and separation of cells. Plants immune to infection usually have leaves with smooth, shiny, waxy epidermis.—*J. Roeser.*

1869. Harter, L. L., and J. L. Weimer. **Studies in the physiology of parasitism with special reference to the secretion of pectinase by Rhizopus tritici.** Jour. Agric. Res. 21: 609–625. 1921.—*Rhizopus tritici* acts in advance of its growth in sweet potato [*Ipomoea*], causing a dissolution of the cells. The fungus produces a powerful intracellular and extracellular enzyme, pectinase, when grown in sweet potato decoction. The maximum enzyme content of the hyphae and of the nutrient solution is attained in cultures about 24 and 48 hours old, respectively. The extracted enzyme effects complete maceration of raw sweet-potato discs. It acts most rapidly at temperatures between 45 and 55°C.; below 45°C., its action decreases directly with the temperature. The enzyme is inactivated at 60°C., and is slightly deactivated by centrifuging to remove sand and fungous debris, and by filtering the solution—in which powdered hyphae and sand are suspended—through filter paper. Exposure of the fungus hyphae to direct sunlight for 2 hours does not affect the macerating power. The enzyme is not affected by toluol (when used as a disinfectant), by washing in water for 15 minutes, or by treating with acetone for 12 minutes followed by ether for 3 minutes.—*D. Reddick.*

1870. Tureson, Göte. **Mykologisks Notiser II. [Fusarium viticola Thüm infecting peas.]** Bot. Notiser 1920: 113–125. *Fig. 1.* 1920.—A severe infection appeared in 1918 at the experimental station at Svalöv, Sweden. The varieties of peas attacked most severely in 1918 were: Non plus Ultra and Stensärt; less so Gradus, Non Pareil, and Champion of England.—Mycelium was found in fissures of the stem. When transferred to culture media, *Aspergillus*, *Penicillium*, *Cladosporium*, *Macrosporium*, and *Fusarium viticola* Thümen were isolated. The inoculations with *Cladosporium* and *Macrosporium* yielded negative results. Peas were germinated in moist sawdust at a temperature of 15–18°C., the following field-peas being used: Concordia, Gröpärt, Soloärt; and of garden peas the marrowfats Non plus Ultra, Stensärt, and Champion of England. The results of 3 kinds of inoculation were as follows: (1) Soil-infection gave positive results in all varieties, some garden-peas (Stensärt, Champion

of England) being more readily infected under laboratory conditions than others. The root-system became infected and developed but poorly. (2) Stem-inoculation produced infection readily in the garden-peas when a mycelium-containing medium was applied to artificially produced wounds on the stem, less readily when stems were intact. Infection did not follow when mycelium alone was used on intact stems. Garden-peas seem to be more susceptible than the field varieties, with the exception of Gröpärt, which readily became infected. (3) With seed inoculation infection followed most readily when seed were inoculated and then germinated.—As only 2–3 per cent of the seed taken from badly infected fields show infection, soil infection is the only one considered important. Proper rotation of crops is suggested as the most practical means of eradicating the disease.—*P. A. Rydberg.*

THE HOST (RESISTANCE; SUSCEPTIBILITY; MORBID ANATOMY AND PHYSIOLOGY)

1871. BEAUVERIE, J. **La résistance plastidaire et mitochondriale. Esquisse d'une méthode applicable à l'étude du parasitisme et des maladies des plantes. [The resistance of plastids and mitochondria. An outline of a method applicable to the study of parasitism and the diseases of plants.]** Rev. Auvergne 38: *16* p. *Pl. 1.* 1921.—The author develops further the facts stated in a former article (see Bot. Absts. 10, Entry 444). The chondriosomes and plastids possess a resistance which varies with the age of the tissues, it being weaker for the meristem than for the older tissues. It perhaps varies with the species, and is diminished by the presenec of a parasite, such as a fungus. This increased weakness under the action of a parasite has been the subject of only a very small number of experiments. The reagents which serve to demonstrate the resistance or susceptibility of the organisms may be distilled water, hypotonic solutions, etc., but the chloroplasts are particularly resistant to their action and the author has been lead to search for a reagent capable of attacking them. This he has found in saponin solution. A solution of 1/1000 acting on a leaf of *Ficaria ranunculoides* parasitized by *Uromyces ficaria* has little effect on the chondrioplastids of healthy tissue, but the action becomes more marked toward the infected zone, where it produces chondriolysis. The author suggests what might be the applications of these facts for studying the intricate mechanism of parasitism, if later studies develop and generalize than: Determining the relative resistance of varieties or even of individuals (for stocks of pedigreed lines) by a preliminary test of the plastidial solidity; study of filterable virus diseases; etc.—*J. Beauverie.*

1872. RAO, P. S. JIVANNA. **Physiological anatomy of the spiked leaf in sandal.** Indian Forest. 47: 351–360. *Pl. 11–12.* 1921.—Spiked leaves have 6 or 7 lines of mesophyll cells packed so closely as to leave no air spaces toward the lower surface. In young leaves the cells in the sheath around the vascular bundles and their ramifications are filled with starch. Older leaves show starch in the central cells and finally throughout the mesophyll. The cells of the lower epidermis also become filled with starch in the later stages.—Starch increases in amount progressively from the youngest to the oldest leaves, but disappears in the advanced stages of the disease, when the plant is dying.—*E. N. Munns.*

1873. WEIMER, J. L., AND L. L. HARTER. **Respiration and carbohydrate changes produced in sweet potatoes by Rhizopus tritici.** Jour. Agric. Res. 21: 627–635. 1921.—The relative amounts of carbon dioxide given off from 2 halves of the same sweet potato [*Ipomoea*], 1 of which was inoculated with *Rhizopus tritici*, were determined. The fungus usually caused complete decay of the inoculated half in 3 days. From 6.3 to 7.8 times as much carbon dioxide was given off from the inoculated half as from the healthy half. Analyses at the end showed smaller amounts of starch, cane sugar, and reducing sugars in the decayed samples than in the healthy ones. The total quantity of carbohydrates lost in the decayed samples was greater than is indicated by the amount of carbon dioxide given off, which suggests that carbohydrates were used in other processes, such as production of fungous material, alcohol, acids, etc. Tests with sterilized tissue showed a similar reduction of carbohydrates by the fungus.—The fungus grows in Czapek's nutrient solution plus glucose, but makes practically no growth when cane sugar is the only source of carbon. When the 2 sugars are used together cane sugar only is reduced.—*D. Reddick.*

1874. WEIMER, J. L., AND L. L. HARTER. **Wound-cork formation in the sweet potato.** Jour. Agric. Res. 21: 637–647. 1921.—Under favorable conditions a cork-layer forms over wounds of the sweet potato (*Ipomoea batatis*). The production of this layer is preceded by the formation of a layer of starch-free cells, usually 3–10 cells deep, beneath the injured surface. Septa begin to appear from the 2nd to the 3rd day, and after 4–6 days a distinct layer of cork cells covers the wound. The process takes place between 19.5 and 33°C., the optimum being 33°. High humidity, 95–100 per cent, is favorable for cork formation; lower limits are not reported. The conditions existing in the storage house did not permit of the formation of a well developed cork-layer, but a hard, dry surface covering did develop through which infection by artificial means could not be secured. The healed surface of a wounded sweet potato also forms a fairly efficient barrier against infection by microorganisms.—*D. Reddick.*

DESCRIPTIVE PLANT PATHOLOGY

1875. AOI, K. **Reddish coloration of polished rice caused by Oospora sp.** [In Japanese.] Bull. Imp. Cent. Agric. Exp. Sta. [Nishigahara, Tokyo, Japan] 45[1]: 29–69. *Pl. 1–3.* 1921.—In north Japan, polished rice, imperfectly dried, frequently becomes purplish red in storage. Various molds and bacteria were isolated from such rice discolored during the summer of 1917 at Sakata, Yamagata, Japan, a large rice distributing town in the north. Infection experiments with pure cultures of the isolated organisms on sterilised polished rice demonstrated that *Oospora* sp. is responsible for the discoloration. When sterilized polished rice containing 18 per cent water is inoculated with this species and left 4–7 days at 25°C., the discoloration appears. Morphologically the fungus is comparatively simple, the differentiation of fertile, nutritive, and vegetative hyphae being rather obscure. The nutritive (long) hyphae, found chiefly in the medium, are divided by septa into numerous segments. The vegetative hyphae grow almost exclusively on the surface of the medium and multiply by budding to form yeast-like colonies on the surface of the culture medium. Fertile hyphae arise from various segments and form conidia. Conidia are also produced by budding on the free ends and sides of nutritive hyphae. The mature conidia are short, elliptical, 3–5μ in diameter, and contain usually 1–10 refringent oil globules; germination is by budding. When the fungus is grown on polished rice containing less than 19.6 per cent water, it assumes a purplish red color; but on rice containing more water it becomes dark or even black in color. No pigment can be extracted by water, alcohol, ether, benzene, benzine, or other ordinary solvents. The purplish coloration is changed to reddish purple by alkaline solutions, and restored by acids. By reduction with nascent hydrogen the color soon disappears. On cooked rice (Japanese "Meshi") and on culture media, the colonies assume first a yellow color, but gradually turn dark or black. Temperature limits of growth are 11 and 35°C., the optimum being about 25°. The minimum water content of rice which permits fungus growth is about 15.5 per cent. On sound, unpolished rice the fungus does not grow, and on polished rice having a water content less than 20 per cent growth is slight. Conidia of the fungus were killed by several hours' exposure to direct sunlight in summer, and by 48 hours exposure to air saturated with carbon bisulphide. But in lower concentrations, viz., 4 pounds carbon bisulphide per 1000 cubic feet, growth was only partially retarded.—*S. Hori.*

1876. BEACH, W. S. **The lettuce drop due to Sclerotinia minor.** Pennsylvania Agric. Exp. Sta. Bull. 165. *27 p., 3 pl., 3 fig.* 1921.—Part I contains a historical review of this disease, which is similar to that caused by *S. libertiana* though differing from the latter in that the sclerotia are much smaller and form crusts on the under surfaces of the lower leaves. Meteorological and environmental relationships show that the disease occurs under a wider range of environments than *S. libertiana* and therefore appears more regularly in localities where both diseases are established. However, it appears to be more restricted in its distribution than *S. libertiana*, apparently on account of its failure to form mature ascospores under ordinary field conditions.—Celery is attacked during the blanching process, but shows considerable resistance, a 5 per cent loss being the maximum recorded. The fungus has also been found on *Portulaca oleracea*, *Verbascum blattaria*, and *Sisymbrium officinale*, which shows that it may have numerous host plants. Inoculations of beets and carrots in winter

storage failed to show pronounced infection.—Crop rotation is important in control. Resistant crops should be grown upon infested soil for at least 2 successive years. Sanitation in the field and packing shed reduces the amount of soil infestation, and clean cultivation, especially the destruction of weeds which harbor the parasite, is advisable. Soil sterilization with various chemicals was tried in 1919 and 1920 without conclusive results, though copper sulphate solution and formaldehyde, both hot and cold, are promising. Bordeaux mixture applied as a drench, crude sulphuric acid followed by lime, cresol, and cyanamid effected little, if any, control.—Of the 3 varieties of lettuce tested under the same conditions, All Heart, a low, flat-headed variety, showed 40 per cent infection; Wonderful, with a medium upright head, showed 16 per cent; and Paris Cos, an upright form, showed 13 per cent infection. It is believed that the differences in amount of infection are explained on the basis of habit of growth.—In part II studies upon cultural and morphological phases are considered. *S. minor* grows well in ordinary culture media, forming sclerotia in heavy crusts. Sclerotia planted in tumblers of sand in September began germination in March, but normal development of apothecia occurred only in a cold frame from March to May. The apothecia are smaller, the asci and the ascospores larger, than those of *S. libertiana.* Apothecia in nature have not been observed by the author.—Direct infection of lettuce leaves by ascospores was not successful, indicating that a preliminary saprophytic development is necessary.—*C. R. Orton.*

1877. DANA, B. F. **Two new Sclerotinia diseases.** Phytopathology 11: 226–228. *Pl. 8.* 1921.—A leaf blight and fruit rot of *Amelanchier cusickii* has been observed in Washington state. The leaves are attacked and killed early in the spring, conidia of the *Monilia* type being produced. Later the fruits are attacked, drying up and hanging on the trees until fall. The following spring apothecia of a Sclerotinia are produced in abundance on overwintered fruits under trees where the disease has appeared. This fungus is described as *Sclerotinia gregaria* n. sp., and is considered the perfect stage of the Monilia which attacks the leaves and fruit.—A very similar disease was found on the young leaves, twigs, and half grown fruits of *Prunus demissa.* Conidia of the Monilia type were produced in abundance on the leaves and twigs, but none have been found on the fruits. Apothecia developed in early spring on the overwintered fruits on the ground. This fungus is described as *Sclerotinia demissa* n. sp., and a technical description is appended. The genetic connection of the conidial and the ascigerous stages has not been demonstrated by cultures in either case.—*B. B. Higgins.*

1878. DAVIS, W. H. **Mammoth clover rust.** Proc. Iowa Acad. Sci. 26: 249-257. 1919. Stages of the rust are described and photographs and line-drawings of spores and sori are given. "The causal organism is probably *Uromyces trifolii.*"—*H. S. Conard.*

1879. FAWCETT, G. L. **La enfermedad de las rayas amarillas de la caña. [Yellow stripe disease of cane.]** Rev. Indust. y Agric. Tucuman 10: 46–48. 1919.—The yellow stripe disease of sugar cane is widely distributed on Java varieties in Tucuman. Variety Kavangire is immune and D 1135 is very resistant. The writer does not consider the disease serious.—*John A. Stevenson.*

1880. GARDNER, MAX W., AND JAMES B. KENDRICK. **Soybean mosaic.** Jour. Agric. Res. 22: 111–113. *Pl. 18–19.* 1921.—Soybean [*Soja Max*], variety Hollybrook, was found affected with a typical mosaic disease at Lafayette, Indiana. The disease is communicable by rubbing and by inoculation of wounds with expressed juice. The incubation period varied in the tests from 13 to 37 days. Fruiting of affected plants is greatly reduced, and most of the seeds are rendered sterile. The viable seeds are undersized; such seeds transmit the disease to the extent of 13 per cent. The disease has not been communicated to garden bean [*Phaseolus vulgaris*] nor to cowpea [*Vigna sinensis*].—*D. Reddick.*

1881. GARDNER, MAX W., AND JAMES B. KENDRICK. **Turnip mosaic.** Jour. Agric. Res. 22: 123. *Pl. 20.* 1921.—Turnip [*Brassica rapa*] was found affected with a typical mosaic disease at South Bend, Indiana. The disease is communicable by rubbing and by inoculation

of wounds with expressed juice. The incubation period in January was 16 days. Radish [*Raphanus sativus*] is not affected and is not a "carrier." [See also Bot. Absts. 10, Entry 1888.] —*D. Reddick.*

1882. Hubert, Ernest E. **Notes on sap stain fungi.** Phytopathology 11: 214–224. *Pl. 7, fig. 1–4.* 1921.—Two types of wood stain due to fungi were studied. A grayish-olive discoloration due to *Lasiosphaeria pezizula* was observed in timbers of beech (*Fagus grandifolia*), red gum, and persimmon (*Diospyros virginiana*). The discoloration is due to massing of the olivaceous hyphae, which are most abundant in and near the medullary ray cells. These cells are modified to some extent, but no distinct decomposition of the cell wall was observed.—The 2nd type studied was a grayish-blue staining of various coniferous and hardwood timbers by *Ceratostomella* sp. The staining is confined almost entirely to sap-wood. The hyphae are able to penetrate the cell walls, though they usually pass through the pits. The enzymes which decompose the wood seem to be confined to the tips of young hyphae. The vessel walls are not noticeably decomposed, but the walls of the ray cells are often so decomposed as probably to produce a slight weakening of the timber.—In both types the discoloration may mask the attacks of other more serious wood-destroying fungi.—*B. B. Higgins.*

1883. Leendertz, C. J. **Een Botrytis-ziekte op roode bessen en rabarber.** [**A Botrytis disease of red currants and rhubarb.**] Tijdschr. Plantenz. 26: 173–175. 1920.—This disease affects primarily the leaf margins, which turn yellow and die; if plants are attacked when young dwarfing occurs. Shoots of affected plants make a weak growth. Sclerotia are formed on the leafless shoots, especially at leaf scars. These sclerotia after overwintering produce conidiophores and conidia in the spring. Winter spraying with carbolineum and summer applications of Bordeaux mixture are suggested as means of control. The Botrytis disease of rhubarb, which followed cold weather in 1920, causes wilting of leaves and petioles. Conidiophores develop abundantly on all parts of the leaf. Complete removal of all leaves at time of pulling and trimming is suggested as the most practical control measure; spraying with Bordeaux mixture is also suggested.—*H. H. Whetzel.*

1884. Mizusawa, I. **A bacterial rot of the saffron crocus.** (In Japanese.) Bull. Kanagawa Prefecture Agric. Exp. Sta. 51. *29 p., 4 pl.* 1921.—In Kanagawa Prefecture an injurious disease has gradually spread since 1916–1917 in the fields of saffron crocus (*Crocus sativus*), cultivated for medicinal purposes. The disease shows 2 symptoms: (1) In November, a basal soft rot affects the leaves, causing them to become yellow and easily detachable from the bulb, which later may either rot completely or produce numerous leaf buds; (2) the most common type of the disease appears first in middle December. A yellowish color begins at the leaf-tips and spreads until the entire leaves become yellow and finally die the following January or February; this is due to slow rotting of roots and bulb. Repeated inoculation experiments on disinfected leaves and bulbs demonstrated that *Bacillus croci* sp. nov. is the causal organism. The following characters are given: A short cylindrical rod with rounded ends, solitary or rarely in pairs, 3.2–1.2 × 1.1–0.6μ, actively motile by 2–4 peripherical cilia which are 8–10, often 15μ, long; no spores or capsules distinguished; Gram negative; growth on agar milky-white, moist, smooth, and glistening, later wrinkled and diminished in luster; optimum temperature 25–28°C., thermal death point 55°C. (10 minutes); reduces methylene blue; reduces nitrates to nitrites; produces no indol or ammonia; does not produce hydrogen sulphide; coagulates milk; liquifies gelatin but not mannan; facultatively anaerobic; renders neutral bouillon gradually alkaline; produces no gas or pigments; grows luxuriantly in a medium containing various kinds of sugar (except cane sugar); best growth in acid media, meager in alkaline; pathogenic to *Crocus sativus* L.; infectious without incisions to narcissus hyacinth, with incisions to purple crocus, onion (*Allium cepa*), and Welsh onion *A.* (*fistulosum*); Group number 221.2233032. Laboratory experiments show that the organism is very susceptible to alkaline disinfectants, and resistant to acid. It is killed by a few minutes' exposure to lime water. The author suggests that applying lime to the field and soaking seed bulbs in lime water should therefore be effective for control of the disease.—*S. Hori.*

1885. QUANJER, H. M., EN J. O. BOTJES. **L'enroulement des feuilles (leptonecrose) et la frisolée (mosaique) de la pomme de terre. [Leaf-roll and curly dwarf potato.]** Ann. Sci. Agron. Française et Etrangère 36: 262–280. 1919.—Phloem-necrosis (leaf-roll) and mosaic (including curly dwarf) are entirely similar in their mode of propagation. Infection does not arise from the soil.—Botjes is credited with the discovery of the method of dispersal in the field and of the method of culture to free stock from disease. Quanjer discovered phloem-necrosis in 1908 and described it in 1913 after being convinced of its diagnostic value for detecting leaf-roll. Leaf-roll, or phloem-necrosis, is contagious and pseudo-hereditary, characteristics which enable it to be distinguished from temporary leaf-roll caused by soil influences. It is also characterized by necrosis of the phloem bundles, thus differentiating it from diseases of the woody vessels. Plants inoculated with the mosaic virus show the first symptoms of mosaic in their offspring, and in the 2nd or later generations an aggravated form of curly dwarf appears. The 2 diseases are similar in that they are scarcely discernible in the year in which infection occurs. In general, phloem-necrosis develops more rapidly in succeeding generations than does mosaic.—Contagiousness of the 2 diseases was proved by grafting diseased tubers on sound ones. Pot experiments in which diseased and sound tubers were in some cases planted together, in others separated, and in which the tops of the plants were or were not separated by glass, have shown that in general the diseases are carried through the soil, only rarely through the air. Botjes' observations tend to show that the phloem-necrosis organism does not winter as a saprophyte in the soil, but is carried by the tubers, and that cases of contagion attributed to soil are due to carriage of the virus—limited to a distance of about 20 m. Inasmuch as the organic union of roots is not verified, it is possible that the virus may live for some time in the soil. Whether root wounds are necessary for infection has not been ascertained.—Experiments show that mosaic passes from tobacco to tomato, and reciprocally, and from tomato to potato, but not from tobacco to potato.—Starch-staining experiments show that the virus of mosaic and similar maladies ascends with the sap and that the infectious matter of phloem-necrosis is carried by the phloem. The so-called senility of certain potato varieties is explained by the fact that these 2 diseases, considered as symptoms of degeneration, and propagated by means of tubers, become intensified with long culture. It is possible that the virus adapts itself gradually to varieties which are at first very resistant.—The basic principle of control methods is the use of an isolated plot for seed production and careful inspection of growing plants.—*A. B. Beaumont.*

1886. RAMIREZ, ROMÁN. **El chahuixtle rojo del frijol. [Rust of the bean.]** Rev. Agric. [Mexico] 5: 830. 1921.—This is an account of *Uromyces appendiculatus* on the common bean.—*J. A. Stevenson.*

1887. SCHULTZ, E. F. **La "Rhizoctonia violacea" en los alfalfares de Tucuman. [Rhizoctonia violacea in the alfalfa fields of Tucuman.]** Rev. Indust. y Agric. Tucuman 10: 154–162. *4 fig.* 1920.—The short duration of alfalfa fields in Tucuman (3–5 years) is generally attributed to weeds, such as *Cynodon dactylon* and *Holcus halepensis*. Weeds, however, are easily controlled. Other causes are tramping by cattle in wet seasons, excessive moisture, poor drainage, lack of lime on acid soils, over-cutting, and over-pasturing. The greatest losses, however, are due to *Rhizoctonia violacea*, which attacks the main root 2–3 inches underground. The factors given above all tend to weaken the host plants and bring about fungus attacks. Diseased plants turn yellow and finally die, leaving bare spots, which soon are occupied by weeds. Other crop plants are susceptible and sweet potatoes in particular should not be used in rotation with alfalfa. The disease can be controlled by careful preparation of the soil, liming, and soil inoculation with legume bacteria. Other crops should not be interplanted with alfalfa.—*John A. Stevenson.*

1888. SCHULTZ, E. S. **A transmissible mosaic disease of Chinese cabbage, mustard and turnip.** Jour. Agric. Res. 22: 173–177. *Pl. B (colored) and 22–23.* 1921.—Chinese cabbage (*Brassica pekinensis*), mustard (*B. japonica*), and turnip (*B. rapa*) are affected with a typical mosaic disease. The disease is readily communicated from one plant to another and from one species to another, both by artificial inoculation and by natural inoculation with the aphis

Myzus persicae. The insect alone produces no symptom of mosaic. The disease is different from mosaic of potato. Tests with turnip show that seminal transmission does not occur. [See also Bot. Absts. 10, Entry 1881.]—*D. Reddick.*

1889. Takimoto, K. **On a bacterial leaf-spot of Antirrhinum majus L.** [In Japanese.] Bot. Mag. [Tokyo] 34: 253–257. 1920.—A new leaf-spot disease on snapdragon, cultivated in the field of the Korean Government Agricultural Experiment Station, has been observed since 1918. As a result of repeated inoculation experiments the author ascribes the disease to a yellow organism which he names *Pseudomonas antirrhini* sp. nov., and which he describes as follows: Cylindrical rod with rounded ends, solitary or in pairs, 0.8–1.2 × 0.3–0.4μ, motile by 1–4, usually 2, unipolar cilia 3.5–4μ long; no capsules or endospores found; Gram negative; growth on agar pale at first, yellow later; liquifies gelatin; separates the casein from milk and gradually digests it, the culture becoming greenish yellow with age; does not produce gas or indol; slightly reduces methylene blue; reduces nitrates to nitrites; aerobic; thermal death point about 51°C.; occurs on *Antirrhinum majus.*—For control, the author recommends rotation and 1 or 2 sprayings with Bordeaux mixture.—*S. Hori.*

1890. Tisdale, W. H. **Two Sclerotium diseases of rice.** Jour. Agric. Res. 21: 649–657. *Pl. 122–126.* 1921.—*Sclerotium rolfsii* is the cause of a seedling blight of rice [*Oryza*] in Louisiana. Blighted seedlings appear in small areas, and frequently follow the drill rows. Sclerotia are abundant on dead roots and bases of stems. Inoculations made on Honduras rice with *S. rolfsii* from rice, soybean [*Soja*], *Arrhenatherum elatius*, and wheat [*Triticum*], show that the fungus from rice and wheat is much more virulent than that from tall oat grass and particularly than that from soy bean. In the experiments affected plants continued to die until irrigation water was applied, after which all plants not too severely damaged recovered.—Sclerotia of the fungus persist for at least 9 months, and submerged in water for at least 5 months. The sclerotia float on water and are thus easily dispersed. The fungus grows vigorously as a saprophyte.—*Sclerotium oryzae* causes a stemrot of rice in Louisiana. The leaf sheath is apparently attacked first, especially after irrigation water is applied. Subsequently the stems are attacked and almost completely destroyed. Lodging follows and the panicles do not fill well. The fungus produced infection when introduced into wounds on Honduras rice. The variety Early Prolific is especially susceptible; Japanese varieties are more resistant.—*D. Reddick.*

1891. Wahl, von. **Schädlinge an der Sojabohne.** [Insect pests of the soybean.] Zeitschr. Pflanzenkrankh. 31: 194–196. 1921.—The principal insect pests are described, and several fungus diseases are incidentally mentioned.—*H. T. Güssow.*

ERADICATION AND CONTROL MEASURES

1892. Anonymous. **Bestrijding van de aardappelziekte.** [Combating potato blight.] Tijdschr. Plantenz. 26: 172. 1920.—This is a brief warning against an early outbreak of late blight sent out by the phytopathological service. Infection is chiefly on the stalks, but following the current dry spell serious spread of the fungus to the foliage is to be expected. Spraying is urged.—*H. H. Whetzel.*

1893. Anonymous. **La siembra del trigo y los tratamientos de la semilla.** [Wheat seeding and seed treatment.] Defensa Agric. [Uruguay] 2: 89–98. *12 fig.* 1921.—The bunt disease (*Tilletia*) of wheat is described, and seed treatment with copper sulphate or formaldehyde is recommended.—*John A. Stevenson.*

1894. Bianchi, Angel T. **Enfermedades de la papa.** [Potato diseases.] Surco [Argentina] 1^{6}: 8–9. 1921.—Dry rot (*Fusarium solani*) and wet rot (*Phytophthora infestans*) are discussed and control measures outlined. [See also Bot. Absts. 9, Entry 920.]—*John A. Stevenson.*

1895. GIDDINGS, N. J. **Orchard dusting versus spraying.** Jour. Econ. Entomol. 14: 225–230. 1921.—Sulphur dust for control of peach scab (*Cladosporium carpophilum*) in West Virginia averaged a little better than liquid sprays. Brown rot (*Sclerotinia cinerea*) data are inadequate because of light infection. Foliage injury resulted only when excessive amounts of material were used. Comparison of copper-lime and sulphur dusts with Bordeaux and lime-sulphur sprays for control of apple scab (*Venturia pomi*) showed that dusts are not so effective as sprays where the disease is severe. The author believes that for rapid progress of dusting the "cooperation of chemistry, physiology, entomology, and horticulture" is necessary, and that negative evidence as well as positive data should be published in order that commercial orchardists may not be unduly influenced and suffer extreme losses. [See also Bot. Absts. 10, Entries 1896, 1897, 1899.]—*J. E. Kotila.*

1896. HEADLEE, T. J. **Dusting as a means of controlling injurious insects.** Jour. Econ. Entomol. 14: 214–220. 1921.—In 3 years' experimentation sulpho-arsenical lime dusts were found practically as effective as self-boiled lime-sulphur and lead arsenate applied as liquid spray for control of insects and diseases of peach. For control of insects and diseases of apple in New Jersey, dusts were not found equivalent in any way to liquid sprays. Experiments in 1920 showed that 90–10 dust impregnated with 1 per cent nicotine is as effective as dust with 3 per cent nicotine, and only a little more than ½ as effective as liquid treatment (¾ pint nicotine to 50 gallons) for control of leafhopper. "Although recently hatched aphids were more efficiently killed by liquid treatments, 90–10 dust impregnated with 1 per cent or more of nicotine caused very material execution." [See also Bot. Absts. 10, Entries 1895, 1897, 1899.]—*J. E. Kotila.*

1897. PARROTT, P. J. **Control of sucking insects with dusting mixtures.** Jour. Econ. Entomol. 14: 206–214. 1921.—Redbugs were found to be very sensitive to nicotine dusts. No difference was found between 0.5 and 1 per cent nicotine dusts. For apple and currant aphis, dusting compared quite favorably with liquid sprays. Mixtures carrying less than 2 per cent nicotine gave very poor control of potato aphis. Nymphs of apple leafhopper were very susceptible to dusts containing 0.5 and 1 per cent nicotine, and 80 per cent of nymphs of the grape leafhopper were destroyed by dehydrated copper-sulphate and lime containing 2 per cent nicotine. Four-lined plant bug nymphs were much more resistant than apple redbug, but dusts with 2 per cent nicotine caused complete paralysis. The degree of susceptibility varied with different species. Density of foliage was found to be a greater factor in obtaining control by dusting than was the case with spraying. [See also Bot. Absts. 10, Entries 1895, 1896, 1899.]—*J. E. Kotila.*

1898. PUIG, JUAN. **Los parasitos vegetales y animales de las plantas cultivadas y espontaneas observados en la Republica Oriental del Uruguay. [Animal and vegetable parasites of cultivated and native plants in Uruguay.]** Inspección Nacion. Ganaderia y Agric. [Uruguay] Bol. 36. *194 p., 52 fig.* 1919.—General directions are given for the control of the more important insect pests and diseases of the crop plants of Uruguay. A list of insects and plant diseases collected by the author is included.—*John A. Stevenson.*

1899. QUAINTANCE, A. L. **Dusting versus spraying of apples.** Jour. Econ. Entomol. 14: 220–225. 1921.—Data obtained in Michigan, Virginia, Arkansas, Connecticut, and Colorado are tabulated. In northern states where codling moth is not especially severe, dusting controls the insect practically as well as spraying. Further south dusting is not a satisfactory control measure. In arid regions, as in Colorado, dusting is notably less effective than spraying. Dusting compared favorably with spraying in control of plum curculio on apple where the insect was not especially abundant. [See also Bot. Absts. 10, Entries 1895, 1896, 1897.]—*J. E. Kotila.*

1900. RITZEMA BOS. J. **Bestrijding van de zoogenaamde "witte roest" der schorzeneeren, veroorzaakt door Cystopus tragopogonis (Persoon) Schroet. [Combating the so-called "white rust" of salsify caused by Cystopus tragopogonis.]** Tijdschr. Plantenz. 26: 216–220. 1920.—Following a brief description of the pathogene and its habits, the author presents the experi-

mental evidence on which he bases his conclusion that the most effective control of this disease is obtained by cutting away the leaves of the plant on the first appearance of the fungus and, later, as new leaves appear, by spraying 2 or 3 times during the season with Bordeaux mixture.—*H. H. Whetzel.*

1901. Slogteren, E. van. **De nematoden-bestrijding in de bloembollenstreek. [Nematode control in the bulb district.]** Tijdschr. Plantenz. 26: 118–138, 161–171, 177–188. *Pl.* 6, 7, *and 11, fig. 1–3.* 1920.—The nematode (*Tylenchus devastatrix*) disease of narcissus presents 3 types of effects, corresponding to period of infestation: (1) Complete failure of leaf development (longest infestation); (2) production of twisted and speckled leaves (infested for 1 season); (3) production of flecks here and there on the blades (infestation of current year). Such flecks differ from ordinary leaf spots by being characteristically thickened or swollen instead of depressed. The effects of attack on the bulbs are described in detail, although they are chiefly internal and considered less reliable for diagnostic purposes than leaf lesions. —Evidence is presented that the parasite was introduced into Holland from England about 1909, and that it became of marked importance in 1916. The relation of this parasite to the nematode long known in Holland as the cause of "ring" or "old" disease of hyacinth is discussed, and an attempt made to decide on experimental evidence whether the nematodes are identical, 2 biological forms of the same species, or 2 distinct species. In the experiments, conducted in 2 series for 3 seasons, healthy narcissus and hyacinth bulbs were exposed under controlled conditions to nematodes from the 2 respective hosts. In no case did the nematode from narcissus attack hyacinth, or vice versa. *Amaryllis*, *Iseme*, and *Galanthus* (*Amaryllideae*), tested in similar cross-inoculation experiments, were attacked by the narcissus nematode only. Nematodes from naturally infested bulbs of these hosts were able to attack narcissus but not hyacinth bulbs. The conclusions are that this parasite of narcissus has not resulted from an adaptation *en masse* by the hyacinth nematode, that the narcissus form has not originated by mutation from the hyacinth form, that the nematode of narcissus is biologically distinct, and that, should morphological distinctions be discovered, specific names should be given to indicate the existence of distinct organisms.—The removal of diseased plants and immediately adjacent healthy ones, as well as replacement of the infested surface soil, is recommended. Chemicals failed to disinfect the soil, and heating appears too expensive for large scale application. Turning under the soil is of doubtful efficiency, since even the deepest and most careful spading does not entirely prevent infection. However, this method is recommended where replacement of the infested layer with clean soil is not feasible. Disinfecting bulbs by hot air and hot water treatments was tried, with promising results. The difficulty of maintaining uniform temperatures with large quantities of bulbs in the hot water treatment was overcome by means of a specially devised thermo-regulator, which is described and figured. In such treatments the size and condition of bulbs are important factors. The heating tends to hasten growth and blooming as well as bringing about control of the yellow disease (*Pseudomonas hyacinthi*).—*H. H. Whetzel.*

1902. Verhoeven, W. B. L. **Plantenziekten, waarmede rekening moet worden gehouden bij de veldkeuring. [Plant diseases which should be considered in field inspection.]** Tijdschr. Plantenz. 26: 149–159. *Pl. 8–10.* 1920.—Field characteristics of the common diseases of cereals and field legumes are briefly described, and the standard methods for control in each case given. The 1st part of the paper deals with cereal smuts and the stripe disease of barley. Rusts are not treated. Wheat affected with stinking smut is said to be more severely attacked by rusts than the non-smutted plants. Copper sulphate treatment is recommended for stinking smut of wheat and covered smut of barley, while for oat smut, hot-water treatment is preferred to formaldehyde. Where stinking smut and loose smut of wheat or the naked and covered smuts of barley occur together both copper sulphate and hot water treatment must be applied.—Bean anthracnose (*Colletotrichum lindemuthianum*), blight of peas (*Ascochyta pisi*), and clover anthracnose (*Colletotrichum* sp.) are discussed in the 2nd part of the article. The author recommends further investigation of several diseases, viz., *Gibberella* disease of oats, root rot of beets (*Phoma betae*), flax anthracnose (*Colletotrichum lini*), and mosaic disease of beans.—*H. H. Whetzel.*

MISCELLANEOUS (COGNATE RESEARCHES; TECHNIQUE; ETC.)

1903. PANTANELLI, E. **Sulla causa del mosaico nelle piante. [The cause of mosaic disease of plants.]** Boll. Mens. R. Staz. Patol. Veg. Roma 1: 40–41. 1920.—A mosaic disease of *Hypochaeris radicata* is produced following punctures by *Macrosiphon tussilaginis*. Only leaves on which the aphis is allowed to feed become mosaic.—The cause of mosaic diseases should be studied with reference to the exclusion of thrips and mites from the cultures.—*D. Reddick.*

1904. STRAND, E. [German rev. of: FRIEDERICHS, K. **Studien über Nashornkäfer als Schädlinge der Kokospalme. Bericht an das Reichs-Kolonialamt über eine 1913/14 im Auftrage ausgeführte Studienreise. (Studies of rhinoceros beetles as pests of the coco-palm. Report to the governmental colonial office upon an expedition undertaken on commission in 1913–14.)** *116 p., 20 pl., 1 map.* Berlin, 1919.] Arch. Naturgesch. Abt. A, 86^{11}: 166. 1920 [1921].

PHARMACOGNOSY AND PHARMACEUTICAL BOTANY

HEBER W. YOUNGKEN, *Editor*

E. N. GATHERCOAL, *Assistant Editor*

(See also in this issue Entries 1453, 1482, 1496, 1503, 1508, 1529, 1537, 1545, 1552, 1564, 1565, 1566, 1595, 1602, 1642, 1938, 1939, 1940, 2028)

1905. BEATH, O. A. **Chemical and pharmaceutical examination of the Woody Aster.** Wyoming Agric. Exp. Sta. Bull. 123. *41–66. Fig. 1–8.* 1920.—The bulletin, in 3 parts, deals with the poisonous properties of *Xylorrhiza parryi*. Part 1 is general in its scope, dealing with the distribution, animals effected, nature of the poison, and a review of the literature. Part 2 is concerned with the experimental methods employed. Part 3 gives the chemical and physical properties and describes the toxicity tests for the water-soluble, the amorphous, and the ether-soluble poisons which were extracted. A bibliography is given.—*James P. Poole.*

1906. BEATH, O. A. **Poisonous plants of Wyoming.** Wyoming Agric. Exp. Sta. Bull. 126· *35 p., 14 pl., 4 fig.* 1921.—A list of the principal poisonous plants of the range, occurring within the state, with the general location, period of activity, and the symptoms of and treatment for the poisoning caused by each of them. Each species is illustrated by a plate. A general introductory discussion covers contributory causes, types of poisonous plants, and preventive measures. The species included are: *Delphinium geyeri* Greene, *D. barbeyi* Huth, *D. menziesii* Nutt., *Lupinus argenteus* Pursh, *Zygadenus intermedius* Rydb., *Xylorrhiza parryi* Gray, *Cicuta vagans* Greene, *Triglochin maritima* L., *Aragallus albiflorus* A. Nels., *Astragalus mollissimus* Torr., *A. bisulcatus* (Hook.) Gray, *Asclepias speciosa* Torr., *Psoralea tenuiflora* Pursh, *Aconitum columbianum* Nutt.—*James P. Poole.*

1907. BEATH, O. A. **The chemical examination of the Silvery Lupine.** Wyoming Agric. Exp. Sta. Bull. 125. *101–114. Pl. 1–2, fig. 1–2.* 1920.—In Part 1 of this bulletin dealing with the poisonous properties of *Lupinus argenteus* Pursh., a description of the plant and its habitat, losses to stock, forage value and chemical constituents, and a summary of the literature are given. Part 2 deals with the experimental methods employed, including toxicity experiments, proximate analyses, estimation of crude alkaloids in the various parts of the plant, methods of extracting alkaloids in quantity, purification of alkaloids, isolation of a crystalline hydrochloride, and the properties of free bases with their effects on blood pressure, respiration, etc., on anaesthetized dogs. A bibliography is given.—*James P. Poole.*

1908. CASPERS, A. C. **De Noordwijksche Geneeskruindentuinen. [The medicinal herb gardens of Noordwijk.]** Weekbl. Bloembollencult. 31: 64. 1920.—A general discussion is given of growing medicinal plants in the vicinity of Noordwijk, Netherlands. Earlier this

was a center for growing medicinal herbs, but the industry was gradually replaced by bulb culture. The plants mainly grown are *Lappa major, Althaea officinalis, Datura Stramonium, Digitalis purpurea, Hysopus officinalis, Ruta graveolens, Thymus vulgaris, Salvia officinalis,* and *Cochlearia Armoracea.* Formerly the plants were dried in the open or in an attic; at present they are treated in a more scientific way, though each grower uses his own method.—*J. C. Th. Uphof.*

1909. GIROLA, CARLOS D. **Plantas medicinales. Posibilidad del cultivo de las especies exoticas en Argentina. Aprovechamiento de las especies indigenas. [Medicinal plants, cultivation of exotic species, and utilization of indigenous species in Argentina.]** Bol. Ministerio Agric. Nacion. [Argentina] 25: 1–46. 1920.—The author outlines the history of the study of medicinal plants in Argentina. A list of plants that should be grown and studied is given. A plan (to include the cooperation of all scientific institutions) is proposed for complete studies of all medicinal plants.—*John A. Stevenson.*

1910. HOUSEMAN, PERCY A. **Comparative researches on the methods proposed for the estimation of glycyrrhizin in licorice root and in licorice extract.** Amer. Jour. Pharm. 93: 388–414, 455–481. 1921.—This is a translation, by Houseman, of the prize research paper of the Hagen-Bucholz Foundation, 1913–1914, by ARMIN LINZ (Arch. Pharm. 254: 65–134, 204–224. 1916.—*Anton Hogstad, Jr.*

1911. HOUSEMAN, PERCY A. **Studies on licorice root and licorice extract.** Amer. Jour. Pharm. 93: 481–495. 1921.—The author discusses the Linz [see preceding entry] method for the determination of the glycyrrhizin content of licorice root, also giving details of his method. The published figures for glycyrrhizin in licorice root are too low. The author has obtained 10 per cent of glycyrrhizin for Spanish and Greek roots and 14 per cent for the Anatolian with Russian and Chinese intermediate.—*Anton Hogstad, Jr.*

1912. KNUTH, RICHARD. **Pelargonium oil.** Amer. Jour. Pharm. 93: 302–315. *Pl. 1, fig. 1–4.* 1921.—The author presents the 1st part of a comprehensive review of the rose-geranium, yielding pelargonium oil, which is used as a substitute for rose-oil. The classification of the plant, with a review of the pertinent literature, is dealt with in detail. The paper also includes a discussion of the morphological constitution of the glands; geographical distribution of the rose-geranium; cultivation; quality and cultivation of the soils; propagation; diseases; harvest; distillation; proceeds and exportation statistics. [See also following entry.]—*Anton Hogstad, Jr.*

1913. KNUTH, RICHARD. **Pelargonium oil.** Amer. Jour. Pharm. 93: 376–387. 1921.—In this installment [see also preceding entry] the author discusses the chemical constitution of the oil. Pelargonium oil is now known to contain the alcohols; geraniol, citronellol, linalol, isoamyl-alcohol; a paraffine; the terpenes phellandrene and pinene; a cyclic ketone; a menthone; a terpineol; a blue-colored high-boiling portion, and different paraffinic acids. The author discusses the various constituents in detail. A bibliography is appended.—*Anton Hogstad, Jr.*

1914. LERENA, CARLOS A. **Envenenamiento del ganado con plantas toxicas argentinas. [Stock poisoning by plants of Argentina.]** Surco [Argentina] 1[4]: 6–7. 1921.—The poisonous plants of Argentina are listed, together with the symptoms produced, and the remedies recommended.—*John A. Stevenson.*

1915. NEWCOMB, E. L., C. H. ROGERS, and C. W. FOLKSTAD. **Podophyllum ash standards.** Amer. Jour. Pharm. 93: 429–432. 1921.—The results of the authors' studies on the ash content and purity of 18 samples of *Podophyllum* show that there is considerable variation in the proportionate amounts of roots and rhizomes, and that these parts are sometimes plump and sometimes shriveled. Plump, starchy roots and rhizomes contain a proportionately small amount of calcium oxalate and yield a low ash. Shriveled roots and rhizomes contain less starch, proportionately more calcium oxalate, and yield a high normal ash.—*Anton Hogstad, Jr.*

1916. Peacock, Josiah C., and Bertha L. DeG. [Peacock]. **Some notes on the astringencies of red rose and pale rose.** Amer. Jour. Pharm. 93: 497–500. 1921.—The authors extracted andpurified the astringent principles of red rose and pale rose. Although the purification was not a complete one, the materials obtained displayed the peculiar properties of the "tannin of red rose" in their behavior toward reagents. The quantity of the astringent substance was far less in the pale Rose, perhaps less than 1 per cent by weight. As astringency is not a characteristic of any one substance, the authors suggest that this group of plant substances may be well placed under the name of "astringents," with a prefix to indicate the source, as,for example, quercastringent, rosastringent, etc. The crystalline substance, which seems to develop under the influence of a mildew on the unstrained infusion of red rose, is regarded as derived from some water-soluble constituent of the rose. On account of its solubility in chloroform, it is clearly distinguished from the astringent principle.—*Anton Hogstad, Jr.*

1917. Quevedo, José María. **El mio-mio o romerillo.** Bol. Agric. Provincia Buenos Aires 1[10]: 3–5. *1 fig.* 1920.—*Baccharis cordifolia* is said to cause heavy losses to stock in Argentina, including horses, cattle, and sheep. The symptoms of the poisoning produced are described and methods of treatment are recommended.—*John A. Stevenson.*

1918. Youngken, Heber W. **Hybridization in plants.** Amer. Jour. Pharm. 93: 249–254. 1921.—A discussion of the term hybrid is followed by a number of illustrations of hybridization among plants, with comparisons of the structural characteristics of parents and hybrids. Attention is directed to the fact that only a small amount of work has been done on the hybridization of medicinal plants, which is assumed to offer great possibilities in improving quality and therapeutic efficiency.—*Anton Hogstad, Jr.*

PHYSIOLOGY

B. M. Duggar, *Editor*

Carroll W. Dodge, *Assistant Editor*

(See also in this issue Entries 1448, 1459, 1462, 1513, 1819, 1829, 1839, 1869, 1872, 1873, 1916, 1980, 1983, 1984)

GENERAL

1919. Alexander, Jerome. **Colloid chemistry. An introduction with some practical applications.** *v+90 p.* Van Nostrand Co.: New York, 1919.—This is "an attempt to compress within a very limited space, the most important general properties of colloids, and some of the practical applications of colloid chemistry." To the discussion of such matters as the significance, classification, and properties of the colloids 35 pages of this little book are devoted, while 48 pages are concerned with the practical applications. The biological aspect is treated primarily under the headings "Physiology and Pathology" and "Digestion."—*B. M. Duggar.*

1920. Eddy, W. H. **The vitamine manual. A presentation of essential data about the new food factors.** *121 p.* Williams and Wilkins Co.: Baltimore, 1921.—The arrangement of the data in this work "aims to provide the student with working material and suggestions for investigation as well as information." The 1st chapter relates the story of the discovery of vitamins, and the 2nd is a brief account of chemical studies which have thus far failed to reveal the exact nature of these food factors. Chapters 3 and 4 are devoted to the indirect vitamin tests, the methodology with rats, guinea pigs, and pigeons; likewise the yeast test for vitamin B. A chapter on "sources" is essentially a series of extensive tables giving the relative vitamin content of about 90 foods or food products. Of the remaining 3 chapters, the most important physiologically is that devoted to the properties of these food factors, with consideration also of heat resistance. Vitamin in diets and diseases that result from vitamin deficiencies are the remaining topics. A bibliography of 28 pages is included.—*B. M. Duggar.*

DIFFUSION, PERMEABILITY

1921. EATON, S. V. **Osmotic pressure in the potato.** [Rev. of: LUTMAN, B. F. **Osmotic pressures in the potato plant at various stages of growth.** Amer. Jour. Bot. 6: 181–202. *2 fig.* 1919 (see Bot. Absts. 3, Entry 800).] Bot. Gaz. 69: 272. 1920.

1922. EGGERTH, A. H. **The preparation and standardization of collodion membranes.** Jour. Biol. Chem. 48: 203–221. 1921.—A simple method of preparing a graded series of collodion membranes of wide range of permeability is presented.—*G. B. Rigg.*

1923. WALLER, A. D. **On the contractility of amputated parts of plants.** Jour. Physiol. 54: lv–lvii. 1920.—Elongation as a result of growth and as a result of turgor changes differs in that the former is irreversible and the latter reversible. At magnifications of 1000 contractions which are visible are not "necessarily due to vegetable contractility analogous with the contractility of animal muscles," but are due to turgor changes. Tetanisation of plant parts may be similar to a corresponding phenomenon in non-living materials, such as a fiddle string, and is not to be taken as evidence of "physiological contractility nor of a physiological modification of growth."—*Ernest Shaw Reynolds.*

1924. WRIGHT, A. E. **On "intertraction" between albuminous substances and saline solutions.** Proc. Roy. Soc. London B, 92: 118–124. 1921.—Layers of egg albumen or serum separating pure water (above) from hypertonic salt solution (below) interfuse with the latter only. Finger-like processes extend from the albumen into the salt solution and vice versa. Aqueous bacterial suspensions penetrate very short distances into hypertonic salt solution while serum suspensions migrate rapidly throughout.—*Paul B. Sears.*

MINERAL NUTRIENTS

1925. CANALS, E. **Du rôle physiologique du magnésium chez les végétaux.** [**The physiological role of magnesium in plants.**] Thèses. (Série A. No. 859. No. d'ordre 1659.) *133 p., 4 pl.* Roumégous and Déhan: Montpellier, 1920.—The author examined the methods of quantitative determination of magnesium and calcium in plants and found that for accurate work great care must be exercised not to vary the methods of precipitating the 2 substances. Calcium was obtained in the form of calcium oxalate and magnesium in the form of magnesium pyrophosphate.—With the exception of the grasses, analyses of different types of plants showed a higher percentage of magnesium in the stems than in the roots. Hydrophytes as a group gave higher percentages of magnesium than the xerophytes. Among the ferns the xerophytic types gave a higher percentage than the hydrophytes.—Using Detmer's solution in which the magnesium sulphate content was varied from 0–1000 mgr. per l., the author found that roots of peas and corn reached their maximum growth in a solution containing 500 mgr. per l.; for stems the optimum was 100 mgr. *Aspergillus niger* in Robert's solution gave a maximum growth with 500 mgr. of magnesium sulphate per l. No growth was obtained in magnesium-free solutions.—Magnesium is toxic only in excessive quantities.—*Ferd. S. Wolpert.*

1926. HART, E. B., H. STEENBOCK, AND C. A. HOPPERT. **Dietary factors influencing calcium assimilation. I. The comparative influence of green and dried plant tissue, cabbage, orange juice, and cod-liver oil on calcium assimilation.** Jour. Biol. Chem. 48: 33–50. 1921.—Limited data indicate that the same factor (vitamin) affecting calcium assimilation and resident in green oats and grasses is present in cod-liver oil.—*G. B. Rigg.*

1927. PETERS, R. A. **The effect of substituting uranium for potassium in growth media.** Jour. Physiol. 54: li–lii. 1920.—In quartz tube cultures uranium could not be substituted for potassium and give 3–4 sub-cultures of *Colpidium.* When added to a potassium culture, uranium stimulated growth. Radio activity of potassium is not its sole use in cultures—if it has such a function.—*Ernest Shaw Reynolds.*

1928. PETERS, R. A. **The substances needed for the growth of a pure culture of Colpidium colpoda.** Jour. Physiol. 55: 1–32. 1921.—This protozoan was kept in a pure tube-culture for a year in a medium of "glass-distilled water, calcium, potassium and sodium chlorides, magnesium sulphate, and ammonium glycero-phosphate." Ammonium phosphate and chloride could not be omitted without inhibition of growth. When magnesium and potassium were left out of quartz-tube cultures growth stopped. The omission of sodium, calcium, and sulphate separately had no effect. Uranium could not be substituted for potassium. Amino acids may be used in place of ammonium as a nitrogen source.—*Ernest Shaw Reynolds.*

METABOLISM (GENERAL)

1929. ALBERTONI, I., E G. BOSINELLI. **Composizione chimica delle paglie di diverse varietà di frumento coltivate nelle stesse condizioni. Loro valore foraggero. [Chemical composition and nutritive value of the straw of different varieties of wheat grown under the same cultural conditions.]** Staz. Sper. Agrarie Ital. 54: 129–136. 1921.—The investigation was undertaken to determine whether the straws of different varieties of wheat differed chemically, and whether such differences can be correlated with varietal characteristics. [The 3rd part of the study, which discloses the percentage of digestible substances in these straws, need not here be abstracted.] Pure line selections were studied after careful cleaning to eliminate weed parts and subjected to the following determinations: moisture, protein substances, fats, nitrogen-free extractives, crude fiber, ash; also CaO and P_2O_5. The varieties studied were the following: Cimone, Normale, Cologna 12, Rieti-I and Rieti-II, Masoline, Gentile rosso-58, Gentile rosso-48, Bordeaux red, Inallettabile-38, Poulard of Australia, Turgido nero, and Duro Portonuovo. The conclusions drawn are the following: The influence of leaves, the height of the culm, etc., upon the crude fiber content should be kept in mind when the latter is considered in relation to the lodging of the straw. The term crude fiber as it is here used does not indicate all nor always the same chemical substance or substances of the plant skeleton, and this fact should not be overlooked when this determination is taken as an indication of stiffness of mature straws. It is the insoluble residue after treatment with dilute H_2SO_4 and NaOH, and botanically it constitutes the greater portion of the cell walls; nevertheless, it does not include all the cellulose nor all the pentoses nor all those substances grouped under the term lignin, since these are not insoluble in the solvents used. Nevertheless, it appears that the varieties more resistant to lodging have culms and leaves with a greater crude fiber content. According to the authors this fact should not be considered essential.—*A. Bonazzi.*

1930. ANDERSON, R. J. **Acerin. The globulin of the maple seed (Acer saccharinum).** Jour. Biol. Chem. 48: 23–32. 1921.—The principal protein of the seed of this maple has been isolated and purified and the name acerin proposed. It is a globulin. When purified it is a nearly white heavy powder which on combustion leaves no weighable ash. Much of the basic nitrogen is present as lysine.—*G. B. Rigg.*

1931. BELL, W. H. **A method for the detection of phenols produced by bacteria.** Jour. Infect. Diseases 29: 424–428. 1921.—A method is described for the detection of phenols in bacterial cultures in concentrations of 1:500,000.—*Selman A. Waksman.*

1932. BRIDEL, M., ET R. ARNOLD. **Sur une méthode permettant l'application, aux végétaux du procédé biochimique de recherche du glucose. [A biochemical test for glucose applicable to plants.]** Compt. Rend. Acad. Sci. Paris 172: 1434–1436. 1921.—A method is given for testing for glucose in plant extracts. It is based on the previous work of Bourquelot and Bridel, who used emulsin to secure the β methylglucoside.—*C. H. Farr.*

1933. CZAPEK, FRIEDRICH. **Zur Kenntnis der silberreduzierenden Zellsubstanzen in Laubblättern. [Silver-reducing cell substances in foliage leaves.]** Ber. Deutsch. Bot. Ges. 38: 246–252. 1920.—This paper was called forth by Molisch's report (1) of the deep black coloration of chloroplasts of living cells treated with 1/10–1 per cent solutions of silver nitrate, (2) in particular, that the silver-reducing substance undergoes a change by which it loses its

silver-reducing power at the moment of the chloroplast's death, and (3) that the substance in question is identical with the carbon dioxide-reducing substance or has a close relation with carbon dioxide assimilation. The reaction in question suggested to the author the reduction of silver nitrate in the cold by pyrocatechol. This substance is precipitated by neutral lead acetate, and the lead salt thus produced, even when washed until no free pyrocatechol is present, gives a distinct reduction of silver. Sections of various leaves treated with lead acetate solution and then washed free of excess of the lead salt showed ability to reduce silver nitrate as in living cells,—evidence that a "Lebensreaktion" is not involved. Czapek inactivated the ferments present and extracted a substance which gave strong silver reduction in the cold. The chemical investigation has not been completed but the substance has been secured in crystalline form. It seems unlikely that it has any connection with carbon dioxide assimilation. The quantity of the silver-reducing substance in the leaves was quickly reduced by enzyme action, on drying, when no measures were taken to inactivate the enzymes.—*R. M. Holman.*

1934. DUTCHER, R. A., H. M. HARSHAW, AND J. S. HALL. **Vitamine studies. VIII. The effect of heat and oxidation upon the antiscorbutic vitamine.** Jour. Biol. Chem. 47: 483–488. 1921.—The substance or substances (vitamin) responsible for the antiscorbutic properties in orange juice are susceptible of oxidation, but in the absence of oxidizing agents are stable to heat up to the boiling point of orange juice.—*G. B. Rigg.*

1935. EDDY, W. H., HATTIE R. HEFT, HELEN C. STEVENSON, AND RUTH JOHNSON. **Studies in the vitamine content. II. The yeast test as a measure of vitamine B.** Jour. Biol. Chem. 47: 249–275. 1921.—Until a basal medium is worked out that provides an optimum of all the factors, except vitamin B, the test must be considered of little value in the estimation of true vitamin content.—*G. B. Rigg.*

1936. EVEREST, A. E., AND A. J. HALL. **Anthocyanins and anthocyanidins. Part IV. Observations on: (a) Anthocyan colors in flowers and (b) the formation of anthocyans in plants.** Proc. Roy. Soc. London B, 92: 150–162. 1921.—The author confirms the hypothesis of Willstätter et al. on the constitution of the blue anthocyan pigments. The findings of K. and Y. Shibata and Kasiwagi (Jour. Amer. Chem. Soc. 41:208–220. 1919) are considered of no value. The blue colors in anthocyan flowers are considered as due to anthocyan phenolates of alkali or alkaline earth metals or complex anthocyan iron salts. In the former case the pigments decolorize on standing, due to a pseudo-base formation. The effects of various salts on anthocyan pigments are recorded and the preparation of the mother substance is noted. Evidence is adduced from a study of developing buds to show that flavonol formation precedes anthocyanin production, probably as an intermediate step. No observational evidence is given for the production of flavonols through anthocyanins.—*Paul B. Sears.*

1937. HOWARD, GRACE E. **Extraction and separation of the pigments of Nereocystis luetkeana.** Publ. Puget Sound Biol. Sta. 3: 79–91. 1921.—It is possible to extract chlorophyll *a* and *b*, carotin, xanthophyll, and fucoxanthin, following the general processes used by Willstätter, but it seems impossible to do this with pure solvents. When put into a colloidal state the chlorophyll carries a negative charge. Magnesium proved to be present in chlorophyll; and there is good evidence of the presence of chlorophyllase in kelp.—*T. C. Frye.*

1938. KOHN-ABREST, ÉMIL. **Detecting poisons in food substances.** Sci. Amer. Monthly 3: 325–328. 1921. [Translated from *La Science et La Vie* Dec., 1920; Jan., 1921.]—There is discussed, among other things, the occurrence of hydrocyanic acid in beans and stone fruits.—*Chas. H. Otis.*

1939. KRAEMER, HENRY. **Plant colors.** Amer. Jour. Pharm. 93: 414–416. 1921.—In this review of the known facts concerning the nature of plant color, the author discusses the anthocyanins. The name anthocyanin, as 1st given by Marquardt, may be used to designate all plant colors other than green and yellow, which are plastid pigments.—*Anton Hogstad, Jr.*

1940. KRAEMER, HENRY. **Some experiments on the modification of color in plants.** Amer. Jour. Pharm. 93: 416–418. 1921.—There are reported briefly some experiments conducted nearly 10 years ago dealing with the modification of color in plants.—*Anton Hogstad, Jr.*

1941. PETERS, R. A. **Nutrition of the protozoa.** Jour. Physiol. 54: l–li. 1920.—Ammonium glycerophosphate served as a complete source of carbon, nitrogen, and phosphorus for *Colpidium*. Ammonium salts will furnish the nitrogen. As sources of carbon the following gave no growth: carbonate, formate, oxalate, glycollate, and citrate; while glycerate, glycerophosphate, tartrate, glucose plus lactate, and leucine (synthetic) gave growth as measured by capability of carrying through 3–4 subcultures. The organism is not dependent upon complicated bodies for its growth and is widely tolerant of the ratio between potassium and calcium salts.—*Ernest Shaw Reynolds.*

1942. SANDO, CHARLES E., AND H. H. BARTLETT. **Occurrence of quercetin in Emerson's brown-husked type of maize** [see Bot. Absts. 10, Entry 528]. Jour. Agric. Res. 22: 1–4. 1921.—The brown husks contain quercetin and a quercetin glucoside; both are lemon yellow in color. If they account for the truly brown color of the husks it must be through their tinctorial quality. The quercitin glucoside of the brown type probably is the counterpart of anthocyanin of the purple type. It is predicted that the pigment of the latter type will be allied to cyanin.—*D. Reddick.*

1943. STEENBOCK, H., MARIANA T. SELL, AND P. W. BOUTWELL. **Fat-soluble vitamine. VIII. The fat-soluble vitamine content of peas in relation to their pigmentation.** Jour. Biol. Chem. 47: 303–308. 1921.—In ripe peas, out of 6 samples investigated, those of green color and carrying also considerable yellow pigment, were far richer in fat-soluble vitamin than yellow peas which contained much less yellow pigment.—*G. B. Rigg.*

1944. STEENBOCK, H., MARIANA T. SELL, AND MARY BUELL. **Fat-soluble vitamine. VII. The fat-soluble vitamine and yellow pigmentation in animal fats with some observations on its stability to saponification.** Jour. Biol. Chem. 47: 89–109. 1921.—In general butters highly pigmented are rich in the vitamin, though the parallel is not close. In beef fats the relations are somewhat similar. In cod-liver oil there is high content of fat-soluble vitamin with low content of yellow pigments. The fat-soluble vitamin withstands severe methods of saponification, hence is not a fat and probably not an ether.—*G. B. Rigg.*

1945. VERKADE, P. E., UND N. L. SÖHNGEN. **Die Angriefbarkeit von cis-transisomeren ungesättigten Säuren durch Pilze. [The capacity of cis- and transisomers of unsaturated acids to be utilized by fungi.]** Centralbl. Bakt. II Abt. 50: 81–87. 1920.—The organisms used were *Aspergillus niger* and *Penicillium glaucum*. The culture medium was tap water with the addition of the following, expressed in per cent: 0.05 KH_2PO_4, 0.05 $MgSO_4$, 0.01 $FeCl_3$, 0.01 $MnSO_4$, and 0.05 $(NH_4)_2SO_4$ or 0.05 KNO_3. The source of nitrogen made no difference in the results. Experiments were carried out with the calcium salts of 20 acids of the oleic series. The results given show no uniformity of utilization, hence no definite conclusion can be drawn. H-ion determinations were made, also the relative solubilities in water and olive oil were determined. A table showing solubilities and distribution coefficients is given. A brief report of the literature is included.—*Grace E. Howard.*

1946. WOODARD, J. **Determination of biological fluids.** [Rev. of: DUGGAR, B. M., AND C. W. DODGE. **The use of the colorimeter in the indicator method of H-ion determination with biological fluids.** Ann. Missouri Bot. Gard. 6: 61–70. *Fig. 1.* 1919 (see Bot. Absts. 4, Entry 1449).] Bot. Gaz. 69: 269–270. 1920.

METABOLISM (NITROGEN RELATIONS)

1947. BOAS, S. **Selbstvergiftung bei Aspergillus niger. [Self-poisoning of Aspergillus niger.]** Ber. Deutsch. Bot. Ges. 37: 63–65. 1919.—This paper is an account of another case of self-poisoning as the result of the production of large quantities of ammonia from urea

(and presumably also amine, through proteolysis) in fungus cultures. Reference is made to the author's recent paper on self-poisoning in *Cladosporium* (Annales Mycologici) and Wehmer's publication on *Penicillium* and *Aspergillus fumigatus* (Ber. Deutsch. Bot. Ges. 1913). With *Aspergillus niger* the phenomenon is very pronounced when the fungus is grown in 5 per cent maltose and 2 per cent urea plus the necessary mineral substances. Maltose is used instead of saccharose because less oxalic acid is formed when the former sugar is employed and less ammonia is used up in neutralizing the acid. As a result of enzymatic splitting of urea the culture fluid becomes strongly alkaline. The alkalinity of the medium seems to be contributed to by the mould itself, and the odor suggests amine as a product of this latter process. The author states the conditions and results of 4 experiments which indicate that in this organism there is a lack of self regulation, the urea-splitting enzyme finally causing death. Cultures of *Botrytis cinerea* and *Oidium* under conditions similar to those used with *Aspergillus niger* remained alive for many months.—*R. M. Holman.*

1948. Chibnall, A. C., and S. B. Schryver. **The isolation of proteins from leaves.** (Preliminary note.) Jour. Physiol. 54: xxxii–xxxiii. 1920.—Ground cabbage leaves were treated with water saturated with ether, thus lowering the surface tension and dissolving otherwise insoluble nitrogenous materials. The latter were precipitated by vaporizing the ether and raising the temperature gradually to 40–60°C. The dried powder was freed from lipoids and chlorophyll and was then separable into 2 portions, one soluble in dilute alkalies and the other insoluble in solvents. The latter portion contained 12 per cent nitrogen and an amorphous acid precipitated by mineral acids from the first portion 11 per cent.—*Ernest Shaw Reynolds.*

1949. Kayser, E. **Influence de la matière azotée élaborée par l'Azotobacter sur le ferment alcoolique. [The influence of the nitrogen compounds elaborated by Azotobacter on alcoholic fermentation.]** Compt. Rend. Acad. Sci. Paris 172: 1539–1541. 1921.—The author attempts to test the hypothesis of Lipman that the effect of *Azotobacter* on plants is through its secretions. Experiments were made with yeast. The addition of *Azotobacter* to the solution containing yeast causes an increase in the multiplication of the yeast cells, an increase in the decomposition of sugar, and in the amount of alcohol formed. The variety of yeast used and the age of the *Azotobacter* cultures were important modifying factors.—*C. H. Farr.*

1950. Levene, P. A. **On the structure of thymus nucleic acid and its possible bearing on the structure of plant nucleic acid.** Jour. Biol. Chem. 48: 119–125. 1921.

1951. Sure, Barnett, and J. W. Read. **Biological analysis of the seed of the Georgia velvet bean, Stizolobium deeringianum.** Jour. Agric. Res. 22: 5–15. 1921.—Hulled seed of velvet bean fed raw to rats proved injurious even when constituting only 40 per cent of the total ration. By cooking for 1 hour at 15 pounds pressure the seed may constitute 60 per cent of a ration without injury, but when they constitute 80 per cent some harmful effects are noted.—The seed are rich in fat-soluble vitamin, which is stable for the treatment given above. The proteins and salts of velvet bean are deficient foods for growth.—*D. Reddick.*

METABOLISM (ENZYMES, FERMENTATION)

1952. Grey, E. C., and E. G. Young. **The enzymes of B. coli communis. Part V. (a) Anaerobic growth followed by anaerobic and aerobic fermentation. (b) The effects of aeration during the fermentation.** Proc. Roy. Soc. London B, 92: 135–150. 1921.—The effect of anaerobic and aerobic growth upon subsequent fermentation of glucose under various conditions has been studied. With anaerobic growth subsequent fermentations yield little lactic or succinic acid, acetic acid appearing instead. Lactic acid production is associated with rapid multiplication of cells, while the production of carbon dioxide with acetic acid or alcohol indicates low vitality. The stimulating effect of oxygen outlasts the stimulus and is not chemically proportional to it. The presence of oxygen during fermentation tends to increase lactic, acetic, and succinic acids as against hydrogen, carbon dioxide, and formic

acid, but does not change alcohol production. The ratio of alcohol to acetic acid fluctuates more under anaerobic than under aerobic fermentation, oxygen being believed to inhibit autoreduction. Aerobic fermentation products show less gain in oxygen than anaerobic; water may be the oxygen source.—*Paul B. Sears.*

1953. Hall, I. C. **A constricted tube with mechanical seal for anaerobic fermentation tests.** Jour. Infect. Diseases 29: 317–320. 1921.—The principle of the constricted tube with a mechanical seal devised by the writer in 1915 for aerobic—anaerobic sterility tests is here combined with the fermentation tube. The anaerobic arm is closed with a rubber stopper, thus making it easier to clean and permitting transfers to be made from the closed arm without admixture from the medium above the seal exposed to the air.—*Selman A. Waksman.*

1954. Hall, I. C. **Criteria in anaerobic fermentation tests.** Jour. Infect. Diseases 29: 321–343. 1921.—Gas production and titratable acidity cannot be used as criteria in anaerobic fermentation tests; an increase in the H-ion concentration is regarded as the best evidence of such fermentation.—*Selman A. Waksman.*

1955. Morgulis, S. **A study of the catalase reaction.** Jour. Biol. Chem. 47: 341–375. 1921.—A crude preparation from liver was used. Little credence can be given to quantitative results of catalase experiments unless very large differences are demonstrated.—*G. B. Rigg.*

1956. Randall, S. B., and I. C. Hall. **The use of B. Welchii in the preparation of sugar-free culture medium.** Jour. Infect. Diseases 29: 344–358. 1921.—It is suggested to use *Bacillus Welchii*, in place of *B. coli*, for the preparation of sugar-free broth, the former removing the muscle sugar, by fermentation, more efficiently.—*Selman A. Waksman.*

METABOLISM (RESPIRATION)

1957. Adolph, E. F., and R. M. Ferry. **The oxygen dissociation of hemoglobin and the effect of electrolytes upon it.** Jour. Biol. Chem. 47: 547–555. 1921.—The equilibrium between oxygen and hemoglobin is a function of that between hemoglobin and electrolytes.—*G. B. Rigg.*

1958. Buckmaster, George A. **The absorption curve of haemoglobin and carbon dioxide.** Jour. Physiol. 54: xcii–xciii. 1921.—The author finds for about 25 points between 0 and 98 mm. pressure of CO_2 "that solutions of haemoglobin behave towards this gas according to the Dalton-Henry law."—*Ernest Shaw Reynolds.*

1959. Haggard, H. W., and Y. Henderson. **Hemato-respiratory functions. XII. Respiration and blood alkali during carbon monoxide asphyxia.** Jour. Biol. Chem. 47: 421–432. 1921.—Oxygen deficiency itself does not directly cause in the tissues and blood an increased production of organic acids.—*G. B. Rigg.*

1960. Wolk, P. C. van der. **Excretions in plants.** Sci. Amer. Monthly 3: 417–418. 1921. [Translated from Die Umschau (Frankfurt), Jan. 29, 1921.]—Flowers, leaves, fruit, and bark are regarded as excretory organs.—*Chas. H. Otis.*

ORGANISM AS A WHOLE

1961. Bonazzi, Augusto. **Studies on Azotobacter chroococcum Beij.** Jour. Bact. 6: 331–369. *Fig. 1–6.* 1921.—A series of 18 experiments is reported in which the utilisation of glucose and nitrogen is studied. It was found that *Azotobacter* utilizes the glucose in the building up of its cell substance and in the preparation of non-reducing substances; these "stores" of carbonaceous material are slowly digested in the presence of oxygen during the process of later development. The sugar is undoubtedly worked over by the cells during the early stages of growth and is then slowly utilized by the cells. It is believed that the sugar apparently lost from a culture in the early stage of development passes through the cells in

large quantities and is transformed into compounds which do not form an integral part of the cells themselves, but are dissolved in the medium. The work on utilization of nitrogen has led to the conclusion that the primary importance of nitrates is in the process of sugar utilization, possibly performing an intermediary function in sugar fermentation and assimilation in forming a sugar-nitrate complex. It is the belief of the author that *Azotobacter*, rather than serving as an active nitrogen gatherer in the soil, may act to immobilize the nitrate nitrogen and to prevent or retard denitrification.—*Chester A. Darling.*

1962. Dernby, K. G., and J. Blanc. **On the growth and the proteolytic enzymes of certain anaerobes.** Jour. Bact. 6: 419–430. *Fig. 1–8.* 1921.—By a series of tests upon 6 species of *Clostridium* the author determined that the optimal H-ion concentration for the growth of these anaerobes was between P_H 6.5 and 7.5, or an average of P_H 7. In the production of proteolytic enzymes, tryptase is probably formed; its activity is optimal at about P_H 6.—*Chester A. Darling.*

1963. Draghetti, Alfonso. **Studio comparativo della resistenza meccanica all'allettamento di alcune razze pure di frumenti. [A comparative study of the mechanical resistance to lodging of some pure strains of wheat.]** Staz. Sper. Agrarie Ital. 54: 145–180. 1921.—The author starts from the assumption that the immediate condition resulting in lodging is an unbalanced equilibrium between external influences and intrinsic resistance of the plant tissues; thus, lodging is immediately a mechanical phenomenon. The more remote causes are classified in 3 groups; (1) nitrogenous hypernutrition, (2) meteorological causes, (3) mechanical maladjustments of the culm. A fundamental cause of predisposition must be searched for in the intensive selection by man, tending to modify the statics of the culm and render it sensitive to adverse nutritive conditions. The author states that lodging takes place before the complete development of the inflorescence, while the plant is still green, and when the resistance of the culms is due more to the turgidity of the cells than to the differentiation of special tissues. The object of the investigation was to determine (1) the existence or non-existence of positive or negative values to be attributed to various varieties under given cultural and biologic conditions; (2) the evaluation of such characters or values as a guide for selective procedures; and (3) the description from a "statical" standpoint of the "*type plant*" free of racial defects. The studies were made on culms at the critical period of stability; the plants while still green were exposed to stormy weather. Pure strains were studied, comprising dwarf, medium, and giant plants as well as beardless, short-bearded, and long-bearded strains, in order to determine the influence of the cross section on the resistance of the culm. The following determinations were made on the green specimens, immediately as brought from the field and before wilting had set in: Total weight, height of culms, position of center of gravity, length, weight, diameter, and thickness of the wall of every internode, weight necessary to determine the "flexion-breaking-point" of the inferior part of every main stalk the "arrow" of inflection, the angle of flexion in degrees, the elasticity of the culm, moments of inertia and of resistance, unity coefficient of breaking moment, moment of wind pressure, moments due to shift of center of gravity, moments of adhesive water, moment of collision of culms, torsion forces, etc. A special apparatus is described and by an integration of the various factors here mentioned a formula is obtained which, unlike that of Kirsche, of Schwesiki-Holdfeiss, and of Albrecht, takes into consideration all factors contributory to resistance or weakness, and thus approaches more the dynamic conditions to which the culm is subjected in the field. Naturally all these factors are correlated with thick and thin seeding and related to the photosynthetic activity of the plant. The forces acting on a culm may be permanent and intermittent. The effect of all these forces is a "dynamic moment" and is equal to the product of their absolute entity by their distance of application from the point of the most vulnerable section. The lower internodes and the "linea di terra" are most subject to the effect of external forces. The length and number of successive internodes are also extremely important. The static equilibrium and the balance of the positive and negative moments of the culm gives a value which constitutes the "index of resistance," which may bear a (+), positive, or (—), negative, sign according to whether it defines culms respectively

resistant or non-resistant to lodging. This index, with remarkable accuracy, expresses mathematically the exact conditions found to exist in the field; the varieties with a (+) index always standing erect, those with a (—) index always lodging in the order of the absolute value of the index number.—*A. Bonazzi.*

1964. Gager, C. Stuart. [Rev. of: Reinheimer, H. **Symbiosis: a socio-physiological study of evolution.** *xii+295 p.* Headley Bros.: London, 1920 (see Bot Absts. 10, Entry 1966).] Torreya 21: 85–86. 1921.—The book is based on the thesis that everything normal in organic evolution is due to essentially cooperative behavior. The reviewer indicates that numerous statements about plants are inaccurate or incorrect, and sure to mislead readers unfamiliar with botany. Maeterlinck's ideas on the intelligence of plants are apparently accepted *literatim.*—*J. C. Nelson.*

1965. Hitchens, A. P. **Advantages of culture mediums containing small percentages of agar.** Jour. Infect. Diseases 29: 390–407. 1921.—It is suggested to use 0.1 per cent agar in culture media for the primary cultivation of specimens suspected of containing anaerobic bacteria and for the study of the physiological relations of pure cultures. This agar gel, composed of colloidal particles in a state of equilibrium, resists the penetration of oxygen, thus offering excellent conditions for the development of anaerobic bacteria and for bacteria requiring partial oxygen tension.—*Selman A. Waksman.*

1966. Reinheimer, H. **Symbiosis: A socio-physiological study of evolution.** *xii+295 p.* Headley Bros.: London, 1920.—The present is not a scientific treatment of symbiosis but, as the title indicates, a philosophical or "socio-physiological" discussion based on the phenomena of symbiosis. Chapter V, The "Intelligence" of Plants, is based on Maeterlinck's L'Intelligence des Fleurs. In Chapter IV, Parasitism vs. Symbiosis, the author states that "biologists fail to recognize that the principle of parasitism differs *toto coelo* from that of symbiosis." [See also Bot. Absts. 10, Entry 1964.]—*C. S. Gager.*

MOVEMENTS OF GROWTH AND TURGOR CHANGES

1967. Langer, Helene. **Zur Kenntnis der tropistischen Krümmungen bei Lebermoosrhizoiden. [Concerning the tropistic curvatures of liverwort rhizoids.]** Ber. Deutsch. Bot. Ges. 37: 262–272. *Fig. 1–2.* 1919.—The gemmae of *Lunularia vulgaris* furnished the principal material. Gemmae of *Marchantia* and thalli of *Riccia fluitans* were also used and gave results similar to those with *Lunularia.* The rhizoids gave a positive geotropic reaction. Weak unilateral illumination sufficed to suppress the geotropic curvature. The rhizoids proved to be positively aerotropic and, according to the concentrations used, positively or negatively chemotropic to KNO_3 and grape sugar. With asparagin and tyrosin, in the concentrations employed, only positive reactions were secured and with $CaHPO_4$ only negative reactions.—*R. M. Holman.*

1968. Liese, J. **Über den Heliotropismus der Assimilationszellen einiger Marchantiaceen. [Heliotropism of the assimilating cells of certain of the Marchantiaceae.]** Ber. Deutsh. Bot. Ges. 37: 293–298. *Fig. 1–4.* 1919.—This is a report of experiments with *Marchantia polymorpha, Fegetella conica,* and other Marchantiaceae. The author found that the direction of illumination of the thalli determined the orientation of those filaments of assimilating cells which developed during the exposure.—*R. M. Holman.*

1969. Stark, Peter. **Über traumatotropische und haptotropische Reizleitungsvorgänge bei Gramineenkeimlinge. [On traumatotropic and haptotropic stimulus conduction in seedlings of the Gramineae.]** Ber. Deutsch. Bot. Ges. 37: 358–363. *Fig. 1–13.* 1919.—The author performed with wound- and contact-stimulated coleoptiles experiments similar to those which Paal (Jahrb. Wiss. Bot. 58: 1918) performed with phototropically-stimulated coleoptiles. The principal question which he sought to answer was whether a stimulus can be transferred from one individual to another of the same or different species. The experiments showed that

a wound stimulus, resulting from contact of one side of the coleoptile with silver nitrate or a red hot glass rod, can be transmitted from a coleoptile tip, which has been amputated and subsequently replaced upon the stump of a coleoptile, across the wound surfaces into the basal part of the coleoptile. This was found to be the case even when the stimulated tip and the stump were from different individuals of (1) the same species, (2) different species, or (3) different genera, though in the last case positive results were not so frequently secured. The material experimented with gave similar results when subjected to contact stimulation. It was also possible to secure a tropistic curvature when a little fragment of injured tissue from the same or some other species was placed eccentrically on the wound surface of a coleoptile stump.—*R. M. Holman.*

TEMPERATURE RELATIONS

1970. Weiss, H. **The thermal death point of the spores of Bacillus botulinus in canned foods.** Jour. Infect. Diseases **29**: 363–368. 1921.—The thermal death point of spores of *B. botulinus* varies with the H-ion concentration of the particular food in question. The more acid foods, such as canned fruits, require a maximum of 50 minutes at 100°, 30 minutes at 105°, and 15 minutes at 110°C., but the majority of canned foods in this group require much shorter exposures. The vegetable products, which are less acid and more nearly approach the neutral reaction, require from 90 to 180 minutes exposures at 100°, 30 to 70 minutes at 105°, and 10 to 20 minutes at 110°C.—The thermal death point also depends on the consistency of the particular food, on presence and concentration of syrup, size of can, size and compactness of the cook, and the retort technic.—*Selman A. Waksman.*

1971. Wright, R. C. **Freezing and undercooling of Irish potatoes.** Potato Mag. 4^4: 14, 16–18. 1921.—Late varieties have lower freezing points, averaging 29.15°F. for the varieties tested. Undercooling at 28°F. for 70 hours, or at 25°F. for 19 hours, caused internal discoloration, which was induced sooner by jarring, air currents, wetting, and rolling in bags.—*Donald Folsom.*

RADIANT ENERGY RELATIONS

1972. Dacy, George H. **Influencia de la luz en el desarrollo de las plantas.** [Influence of light on the growth of plants.] Rev. Agric. Tropic. [Salvador] 1:209–216. 1921.—This is a review of the work of Garner and Allard (see Bot. Absts. 5, Entry 22) reprinted from La Hacienda.—*J. A. Stevenson.*

1973. Walker, W. F., and R. W. Pryer. **Bactericidal action of water treated by ultra violet rays.** Amer. Jour. Public Health **11**: 703–706. *Fig. 1.* 1921.—Results are given which show "that the exposure of water to ultra violet light emitted from a quartz mercury vapor lamp, imparts to water a definite residual bactericidal property."—*C. A. Ludwig.*

TOXIC AGENTS

1974. Peters, R. A. **Variations in the resistance of protozoon organisms to toxic agents.** Jour. Physiol. **54**: 260–266. 1920.—The results of experiments testing the toxicity of mercuric chloride upon *Colpidium* plotted as the logarithm of the percentage of survivors gave a straight line curve except a slight "kink" at the beginning. It is reasoned that this type of curve is indicative of variations, of the organisms, in resistance to toxic agents. The study of frequency curves and the logarithmic curve of the S-curve gives the chief data for the argument.—*Ernest Shaw Reynolds.*

1975. Rose, D. H., Henry R. Kraybill, and R. C. Rose. **Effect of salts upon oxidase activity of apple bark.** Bot. Gaz. **69**: 218–236. *5 fig.* 1920.—One-tenth normal solutions of all the chlorides tested (potassium, sodium, lithium, caesium, ammonium, calcium, manganese, ferric) decreased oxidation of pyrogallol by apple bark powder. Oxidation was increased very slightly by 0.1 N solutions of all the sulphates tested. Potassium, sodium, and mag-

nesium nitrates (0.1 N) had practically no effect on oxidation, while nitrates of calcium, barium, manganese, and iron (ferric) decreased it. Potassium chloride (0.02 N and 0.002 N) had no effect on oxidation, while manganese chloride in these concentrations increased it. Tartrates, oxalates, citrates, acetates, and carbonates increased oxidation, this being due in part at least to the low acidity of the mixtures of bark, pyrogallol, and salt. Marked decrease in oxidation is not necessarily accompanied by high acidity of the mixtures. Ions other than the hydrogen and hydroxyl may be important in regulating oxidase activity. In neutralizing hydrogen or hydroxyl ions, it is important to take into consideration, in the study of oxidase activity, the possible effect of the salts formed thereby. The chlorides which retard the combustion of tobacco at high temperatures also retard the oxidase action at low temperatures. The effect of the alkali chlorides upon oxidase activity suggests a practical application in preventing the browning of fruits and vegetables during their preparation for canning, preserving, or drying.—*Authors' Abstract.*

ELECTRICITY AND MECHANICAL AGENTS

1976. S., J. [Rev. of: BAINES, E. A. **Germination in its electrical aspect.** *xx+185 p., 130 fig.* Routledge: London, 1921.] Jour. Bot. 59: 237–238. 1921.

MISCELLANEOUS

1977. PRINGSHEIM, ERNST G. **Über die Herstellung von Gelatinefarbfiltern für physiologische Versuche. [On the preparation of gelatine color filters for physiological experiments.]** Ber. Deutsch. Bot. Ges. 37: 184–186. 1919.—Attention is called to the method, described in an earlier paper by the author, of securing monochromatic color filters by staining fixed, unexposed photographic plates in solutions of various dyes. The difficulty encountered in eliminating the extreme red end of the visible spectrum was overcome by screens prepared by pouring gelatin dissolved in a solution of Grübler's soluble Berlin blue upon clean glass plates. A list is given of the stains used and indications are furnished concerning the light absorbed and that allowed to pass by each of the stains.—*R. M. Holman.*

SOIL SCIENCE

J. J. SKINNER, *Editor*
F. M. SCHERTZ, *Assistant Editor*

(See also in this issue Entries 1448, 1459, 1462, 1488, 1651, 1660, 1949)

GENERAL

1978. ALWAY, F. J., P. R. McMILLEN, AND C. O. ROST. **A successful cooperative experiment on a potash-hungry peat of doubtful lime requirement.** Jour. Amer. Peat Soc. 14[3]: 5–18. 1921.—A typical Minnesota peat soil, having an acid reaction and approximately 1 per cent of lime, contained sufficient nitrogen and lime for clover, barley, flax, corn, sunflowers, potatoes, beets, and cabbage.—*G. B. Rigg.*

1979. ANGELIS D'OSSAT, G. DE. **L'argilla colloidale del terreno agrario. [The colloidal clay of agricultural soils.]** Staz. Sper. Agrarie Ital. 54: 214–224. 1921.—The question is studied in general, the aim being to show that many of the properties of soil are due not only to the quantity of colloidal clay contained therein, but to the response of the relatively small percentage of this substance to the influence of the various environmental factors. Heat and pressure are regarded the most important and are to be considered with respect to the following manifestations: heat manifested as temperature, sunlight (thermic, actinic, and luminous rays each playing a specific role), evaporation, and freezing. Pressure, considered apart from its heat effects, is also of great importance as is demonstrated by the stability which some metamorphic rocks and shales assume when submitted to it. Reversible and irreversible changes which take place in ordinary soils in the deep layers should here be ascribed to this action.—*A. Bonazzi.*

1980. Blanck, E., und F. Preiss. **Über die Stickstoffwirkung der sich bei der Konservierung der Jauche mit Formalin bildenden Stoffe auf die Pflanzenproduction. [Influence of the nitrogen, in liquid manure conserved by means of formalin, upon plant production.]** Jour. Landw. 69: 33–48. 1921.—The hexamethylenetetramine present in liquid manure conserved with formalin acts favorably upon plant production. Aldehyde-urea, a condensation product, did not give favorable results. For best results it is concluded that formalin should not be added to liquid manure until all of the urea has been converted into ammonia.—*F. M. Schertz.*

1981. Christian, H. Basil. **Experiments in soil treatment in the Enterprise District, southern Rhodesia.** Rhodesia Agric. Jour. 18: 405–410. *2 fig.* 1921.

1982. Coppa, Amalia. **Ricerche sui protozoi dei terreni e delle acque ticinesi. [Researches upon the protozoa of the soils and waters of the Ticino.]** Staz. Sper. Agrarie Ital. 54: 181–213. *Fig. 1–5.* 1921.—A qualitative-quantitative count of the protozoa found in cultivated soils, irrigated rice fields, irrigated pasture lands, and irrigation waters is presented. The influence of various fertilizers upon these counts was studied and found to be negligible. The geological origin of the soils appears to have a decided influence upon the count. Siliceous soils have a greater protozoan content than calcareous soils. A characteristic facies was found only in rice fields, since water was found to be the factor which influenced to the greatest degree the unicellular life in a soil.—*A. Bonazzi.*

1983. F[yson], P. F. [Rev. of: Beckley, V. A. **The preparation and fractionation of humic acid; and the formation of humus.** Jour. Agric. Sci. 11: 66, 69. 1921.] Jour. Indian Bot. 2: 212. 1921.

1984. F[yson], P. F. [Rev. of: Harrison, W. H. **Carbon dioxide in relation to rice soils.** Mem. Depart. Agric. India Chem. Ser. 5: 181-194 1920.] Jour. Indian Bot. 2: 212. 1921.

1985. Geilmann, W., und A. van Hauten. **Die Änderung der löslichen Bodensalze und der Schlämmkurve gedüngter Parzellen im Laufe der Entwicklung von Rüben. [Variation of the soluble salts and the elutriation curve of fertilized plots during the course of the development of beets.]** Jour. Landw. 69: 105–130. 1921.—Plot experiments in 1919 and 1920 showed that the amount of water-soluble salts in the soil was greatly infuenced by fertilizers. Soluble salts varied during the course of the growing season and were found to be somewhat correlated with the moisture content of the soil. Elutriation curves were found to be greatly influenced by fertilizers.—*F. M. Schertz.*

1986. Mezger, C. **Über unterirdische Dampfströmungen und ihre Bedeutung für den Wasserhaushalt des Bodens. [Subterranean water-vapor currents and their significance in the water economy of soils.]** Jour. Landw. 69: 49–64. 1921.—This study, which is largely a review of the literature, includes a review of conditions which make for an increase and a decrease in the ground water.—*F. M. Schertz.*

1987. Seelhorst, C. von., W. Geilmann, und H. Hubenthal. **Über den Einfluss von Düngung und Pflanzenwuchs auf die Fallkurve von Wasser-Bodengemischen. [Influence of fertilizing and plant growth on the precipitation curve of water-soil mixtures.]** Jour. Landw. 69: 5–32. 1921.—Wiegner's method was used in the analysis by elutriation and the Kohlrausch-Holburn method for estimating conductivity. From various experimental plots the authors collected data on the solubility of the salts in the soil as affected by fertilizing and by the plants grown.—*F. M. Schertz.*

1988. White, J. W., and F. J. Holben. **Soil fertility experiments on De Kalb, Volusia and Westmoreland soils.** Pennsylvania Agric. Exp. Sta. Bull. 166. *23 p., 1 fig.* 1921.—The experiments here reported are located in Center County on De Kalb soil; in Bradford County on Volusia soil; and in Washington County on Westmoreland soil, and comprise 152 plots on 18.4 acres.—On De Kalb soil the average yields for 5 years upon 5 unfertilized plots was for clover hay practically 0; corn, 2.8 bushels; oats, 7.8 bushels; wheat, 0.12 bushels. The maximum application of commercial fertilizers gave an average yield of 1800 pounds clover hay, 39.3

bushels corn, 39.3 bushels oats, and 20.8 bushels wheat. The total yield of all products for this plot was 15,011 pounds as against 2,196 pounds for the rotations average yield on the 5 unfertilized plots. Phosphoric acid has given the greatest yield of grain, clover hay, and Kentucky blue grass. Potash has given the next greatest yield of grain and clover hay while nitrogen has given a greater yield of blue grass than potash. Acid phosphate has been 5 times as effective as rock phosphate, on the basis of equal amounts of phosphoric acid, in bringing about increased yields.—On Volusia soil the results of 2 years' experiments show that lime is indispensible in crop improvement. Six tons of manure with lime gave an increase over manure alone of 1250 pounds hay, 10.8 bushels corn, and 4,378 pounds pasture grasses. Manure reinforced with acid phosphate on limed soil gave an increase over manure used alone of 1350 pounds hay, 20.3 bushels corn and 6,438 pounds pasture grasses.—On the Westmoreland soil the most striking result for the 2 years is to be seen in the comparisons between acid phosphate and rock phosphate. On 4 plots on which the 2 sources of phosphoric acid were compared, acid phosphate was 183 per cent more effective than the rock phosphate for the proportions used in the experiment. Fertilizers carrying nitrogen and phosphorus have been very effective in the production of blue grass as well as native pasture grasses. Manure treatments have shown the greatest development of total pasture grasses, while complete fertilizer has been most effective in developing blue grass.—*C. R. Orton.*

1989. Whitney, Milton. **Fundamental principles established by recent soil investigations.** Science 54: 348–351. 1921.—This review covers the work of the U. S. Bureau of Soils for the last 20 or 30 years. The writer points out the results of study of the texture and organic chemistry of the soil, the mineral chemistry of the soil solution, and the colloidal chemistry of the soil. Lists are given of the organic compounds and of the mineral salts that have been identified from the soil.—*C. J. Lyon.*

1990. Wiegner, G. **Boden und Bodenbildung in kolloidchemischer Betrachtung. [Soil and soil formation considered from a colloid-chemical standpoint.]** *98 p.* Th. Steinkopff: Dresden & Leipsic, 1918.—The relation of colloid chemistry to soil formation is treated by chapters as follows: (1) Later developments in the study of colloid-chemistry; (2) application of the results to soil science; (3) properties of colloidal solutions and precipitates (solid dispersions and dispersoids); (4) the protective influence of humus upon soil dispersions, humus acting like certain albumens in retarding and preventing the precipitation of colloid particles by electrolytes; (5) the reciprocal precipitation of oppositely charged colloids ("dispersoids") and the formation of interchangeable zeolites; and (6) the formation of soils. In the last, soils are classified and described under 7 types ranging from extremely arid to extremely humid. [Through review by Niblas in Naturw. Zeitschr. Forst- u. Landw. 18: 191–195. 1920.]—*J. Roeser.*

1991. Wilson, B. D. **Sulfur supplied to the soil in rainwater.** Jour. Amer. Soc. Agron. 13: 226–229. 1921.—A brief summary is given of the amount of sulphur in rain. If sulphur is applied to soils for the express purpose of supplying the needs of plants with an essential element, its application is unnecessary in many localities and is not desirable in the vicinity of large industrial cities.—*F. M. Schertz.*

ACIDITY AND LIMING

1992. Blair, A. W. **A comparison of magnesian and non-magnesian limestones.** Jour. Amer. Soc. Agron. 13: 220–225. 1921.—Eleven years of work with the 2 forms of limestone are reported on 4 different crop rotations. When measured in terms of total nitrogen returned in crops, the magnesian limestone appears to be slightly superior. The 2 limestones have about the same corrective power when measured by the H-ion concentration and by determinations of lime requirements of samples of the treated soils. The use of magnesian limestone does not indicate any toxic effect.—*F. M. Schertz.*

1993. Frear, William. **The fineness of lime and limestone application as related to crop production.** Jour. Amer. Soc. Agron. 13: 171–184. 1921.—The best limestone for agricultural purposes is said to be that which will pass a 20 or 40 mesh sieve.—*F. M. Schertz.*

1994. Gardner, Frank D. **Liming as related to farm practice.** Jour. Amer. Soc. Agron. 13: 210–220. 1921.—A practical discussion of liming is presented.—*F. M. Schertz.*

1995. Lipman, Jacob G. **The value of liming in crop rotation with and without legumes.** Jour. Amer. Soc. Agron. 13: 206–210. 1921.—In rotation of non-legumes, lime is not a vital factor in increasing nitrogen yields except in the case of soils well supplied with organic matter or so deficient in lime and other basic materials as to lead to textural deterioration or to the formation of toxic compounds of aluminum or iron. It is difficult and uneconomical to maintain an adequate supply of nitrogen in the soil with rotations of non-legumes. The importance of lime is shown, for the proper accumulation of nitrogen from the atmosphere, in the case of crop rotation with legumes.—*F. M. Schertz.*

1996. MacIntire, W. H. **The nature of soil acidity with regard to its quantitative determination.** Jour. Amer. Soc. Agron. 13: 137–162. 1921.—A review is presented of the present day literature and a summary of the ideas regarding the acidity of rock-derived soil.—*F. M. Schertz.*

1997. Mooers, C. A., and W. H. MacIntire. **The comparative effect of various forms of lime on the nitrogen content of the soil.** Jour. Amer. Soc. Agron. 13: 186–205. 1921.—In 4 series of experiments lime in the form of oxide, hydrate, precipitated carbonate, ground limestone, ground dolomite, and precipitated magnesium carbonate were used. Plots of $\frac{1}{10,000}$ acre were treated at the rate of 2 and 8 tons per acre. Liming at the 2-ton rate resulted with the same loss of soil nitrogen in all the series. Both the oxide and the hydrate when applied at the rate of 8 tons per acre resulted in a waste of nitrogen. Precipitated $MgCO_3$ induced losses comparable with those of precipitated $CaCO_3$. The oxide and hydrate induced the greater losses, while ground limestone and dolomite induced the least losses of soil nitrogen. Fine precipitated carbonate when applied at the rate of 2 tons induced nitrogen losses almost indentical with those of the oxide and hydrate, but when applied with dolomite at the 8-ton rate ranked with dolomite and ground limestone.—*F. M. Schertz.*

1998. Plummer, J. K. **The effect of liming on the availability of soil potassium, phosphorus and sulfur.** Jour. Amer. Soc. Agron. 13: 162–171. 1921.—The addition of calcium and magnesium compounds does not increase to any practical extent the availability of the soil's store of native potash. Additions of calcium or magnesium does not reduce the necessity of applying phosphates to the soil. The solubility of native soil sulphates apparently is increased by lime addition.—*F. M. Schertz.*

TAXONOMY OF VASCULAR PLANTS

J. M. Greenman, *Editor*

E. B. Payson, *Assistant Editor*

(See also in this issue Entries 1477, 1511, 1559, 1650, 1720)

GENERAL

1999. Anonymous. [Rev. of: Britton, N. L., and C. F. Millspaugh. **The Bahama flora.** *viii+695 p.* Ackerman: Bronx Park, New York City (see Bot. Absts. 7, Entry 1429).] Jour. Botany 59: 112–114. 1921. [See also Bot. Absts. 8, Entry 2235; 10, Entry 322.]

2000. Cheeseman, T. F. **Contributions to a fuller knowledge of the flora of New Zealand: No. 7.** Trans. and Proc. New Zealand Inst. 52: 9–16. 1920.—There are listed 33 plants, 7 of which are introductions, showing extensions of range or peculiarities of habitat. Pneumatophores are described on *Eugenia maire* A. Cunn. *Solanum aviculare* Forst. var. *albiflora* is a new variety described here.—*Wm. Randolph Taylor.*

2001. [Druce, G. Claridge.] **New county and other records.** Bot. Soc. and Exchange Club British Isles Rept. 5: 93–137. 1917 [1918]; 365–412. 1918 [1919]; 635–694. 1919 [1920].

2002. Fontanel, P. **La taxonomie et la multiplication des espèces en botanique.** [**Taxonomy and the multiplication of botanical species.**] Nat. Canadien 47: 174–182, 195–204, 224–234, 244–254. 1921.—Canadian and U. S. A. botanists are charged with multiplying and confusing plant nomenclature, partly through ignorance of French and Latin and especially under the influence of the Darwinian hypothesis of evolution which, ignoring the fixity of species, tends to multiply described varieties. (A) Cuvier's definition: "A species is the collection of all individuals descended one from the other or from common parents, all of whom resemble them as they resemble each other," he would express as: "The assemblage of individuals which can reproduce from among themselves fertile descendants;" or "the assemblage of individuals which are not so far differentiated as to cease to produce together similarly reproductive individuals." (B) He next proceeds to show the great variation produced by soils, physical and chemical influences; temperature, general and at special stages of development; and even organic infections. "It is therefore both proper and prudent to distrust every new species or variety described by a taxonomist who runs rapidly through a region new to him . . . . lists published at the end of vacation excursions, where the new species are figured by half dozens, if not by thousands like the hawthorns of 'Mont-Royal.'"—*A. H. MacKay.*

2003. Gleason, H. A. [Rev. of: Deam, Chas. C. **The trees of Indiana.** Dept. Conservation Indiana Publ. 13. *317 p., 137 pl.* 1921.] Torreya 21: 66–68. 1921.—This 2nd edition, completely rewritten, recognizes 132 species and 20 varieties. Each species is illustrated by a half-tone plate. The nomenclature is that of the International Code. Descriptions are based on Indiana material. Ranges within the State are discussed in detail, and general notes of a popular nature are added. The attitude toward new varieties and forms is conservative, and the treatment has been carried out with extreme care.—*J. C. Nelson.*

2004. Hayward, Ida M., and G. Claridge Druce. **The adventitious flora of Tweedside.** *Large 8 vo., xxxii+296 p., 791 pl.* Buncle & Co.: Arbroath, 1919.—The introduction states that the species enumerated were found by Miss I. M. Hayward, who also supplied the local notes respecting the time and place of occurrence, and the flowering period of the various species. Druce prepared the introduction, classified the plants, and wrote the botanical text and descriptions. The introduction gives the history of Galashiels, which is the chief seat of the tweed industry, an account of sheep and wool, of the methods of ridding wool from various fruits and seeds, and of the manner in which seeds get into streams and germinate on their banks. Three hundred and forty-eight species introduced in wool have been found. These, together with the families and genera to which they belong, are described; also their geographical origin is suggested. One hundred and thirteen species are presumably of Mediterranean origin, 48 eastern European and western Asiatic, 14 central Asiatic, 43 South African, 51 Australasian, 23 North American, 8 Tropical American, 43 South American, and 5 unknown. Of these the genus *Lepidium* afforded a new species each for South America, and Africa, and 2 for Australasia, the island continent also affording a new species of *Millotia* not yet found in its native home. A new hybrid, *Chenopodium Haywardiae* Murr (*C. striatum* × *C. album*), was another interesting discovery. A list of the other introduced species of Tweedside is also given as well as a comparison with the adventive plants enumerated in Thellung's Flore Adventice de Montpellier, 1912.—*G. C. Druce.*

2005. Holmberg, Otto R. **Anteckningar till Nya Skandinaviska Floran. I.** [**Notes to the New Scandinavian Flora. I.**] Bot. Notiser 1920: 161–166. 1920.—As 40 years have elapsed since the last complete edition of Hartman's Handbook, and 30 years since the first part of the 12th edition (all that was ever published), and many changes in nomenclature have been made and new knowledge added, the author thought it advisable to publish notes while the New Flora was going to the press. In this first paper he discusses the genus *Equisetum*, beginning with the names *E. limosum* L. and *E. fluviatile* L. He regards the latter as a variety of the former, and not, as many botanists have held, the same as *E. maximum* Lam. (= *E. Telmateia* Ehrh.). He criticizes Hartman for regarding *E. fluviatile* the species and *E. limosum* the variety. The author further describes and discusses the following hybrids:

E. arvense × *Thelmateja*, *E. arvense* × *pratense*, *E. hiemale* × *variegatum*, and *E. scirpoides* × *variegatum*(?).—*P. A. Rydberg.*

2006. PAU, C. **El herbario de Planellas.** [**Planellas' herbarium.**] Brotéria Sér. Bot. 19: 49–65. 1921.—Señor Pau has studied the herbarium of D. José Planellas y Girald preserved at the University of Barcelona. Ninety per cent of the specimens come from botanic gardens. Planellas's careful labelling rendering confusion impossible, but there is also material from Madrid, Saragossa, and Catalonia, as well as a small amount from botanists. The present article is concerned only with plants from the province of Galicia, Spain, following the *Ensayo de la flora fanerogámica gallega* of Planellas. There are critical notes in most cases, references to the Ensayo, indication of those species of which Galician specimens are wanting in the herbarium, and codification of the names with present day nomenclature, The present installment covers the families Ranunculaceae to Rutaceae [pars?] in the DeCandollean sequence, and is to be continued.—*E. B. Chamberlain.*

2007. WHITE, JAS. W. **Report of the Distributor for 1919.** Bot. Soc. and Exchange Club British Isles Rept. 5: 801–849. 1919 [1920]. Plants distributed number 7447.—*G. C. Druce.*

2008. WILLIAMS, F. N. **Genders of generic names.** Jour. Botany 59: 205. 1921.—Refers to Jour. Botany 59: 157, T. A. Sprague's article on "Plant Nomenclature: some Suggestions."—*S. H. Burnham.*

PTERIDOPHYTES

2009. MARTIN, W. **Pteridophytes of the Banks Peninsula (eastern portion).** Trans. and Proc. New Zealand Inst. 52: 315–322. 1920.—This paper presents a list of 60 pteridophytes at present known to be growing on the Peninsula, with their localities and habitats. This adds to the known flora 8 species previously reported but which a recent writer (Laing) had considered lost to the region, namely: *Alsophila Colensoi* Hook. f., *Hypolepis distans* Hook, *Pteris tremula* R. Br., *Blechnum vulcanicum* Kuhn, *Polystichum adiantiforme* (Forst.) J. Sm., *Dryopteris velutina* O. Ktz., *Lycopodium scariosum* Forst., and *L. Billardieri* Spring (?). One new record for the area is presented, *Azolla rubra* R. Br. The disappearance of a considerable number of species is attributed to the removal of the forests and the feeding of cattle on the undergrowth in some of the areas that remain.—*Wm. Randolph Taylor.*

2010. WATERLOT, ET DECARY. **Ptéridophytes de l'herbier du Muséum recoltées à Madagascar.** [**Pteridophytes of the herbarium of the Museum collected in Madagascar.**] Bull. Mus. Hist. Nat. [Paris] 26: 540–546. 1920.—A list is given of the pteriodphytes from Madagascar in the herbarium of the Museum. The specimens are cited with complete data. The determinations were made by Prince Bonapart.—*E. B. Payson.*

SPERMATOPHYTES

2011. ASHE, W. W. **Notes on Rhododendron.** Rhodora 23: 177–179. 1921.—A description is given of *R. carolinianum margarettae* n. var., a white-flowered variety which resembles the type in habit and is found in the same general region in North Carolina, only farther south and at lower altitudes. The author also reports new stations in North Carolina for *R. atlanticum* Rehd. (*Azalea atlantica* Ashe) and *R. neglectum* n. comb. (*Azalea neglecta* Ashe).—*James P. Poole.*

2012. BENNETT, A. **Sparganium angustifolium Michx.** Jour. Botany 59: 235–236. 1921.—A full synonymy is given.—*Adele Lewis Grant.*

2013. BLAKE, S. F. **The American species of Maximilianea (Cochlospermum).** Jour. Washington [D. C.] Acad. Sci. 11: 125–132. *Fig. 1–2.* 1921.—The following species and varieties are described: *Maximilianea codinae* (Eichl.) Kuntze, *M. regia* Mart. & Schrank, *M. regia glaberrima* Chod. & Hassl., *M. regia mattogrossensis* (Pilger) Blake, *M. vitifolia*

(Willd.) Krug & Urb., *M. triphylla* sp. nov., *M. tetrapora* (H. Hallier) Blake, *M. orinocensis* (HBK) Kuntze, *M. Parkeri* (Planch.) Kuntze, *M. paviaefolia* (Planch.) Kuntze. A key to the species is given.—*Helen M. Gilkey.*

2014. BRITTEN, JAMES. **James Yates's drawings of cycads.** Jour. Botany 59: 221–224. 1921.—These drawings, given by Mrs. Yates to the Linnaean Society, are enumerated and described.—*Adele Lewis Grant.*

2015. CEDERGREN, GÖSTA R. **Anteckningar till Sverges adventivflora. I. Melilotus Hill.** [**Notes on the adventive flora of Sweden.**] Bot. Notiser 1920: 135–143. 1920.—The author admits 8 species of *Melilotus* as having been found in Sweden: *M. dentatus* Pers., *M. altissimus* Thuill., *M. albus* Desr., *M. wolgicus* Poir., *M. officinalis* (L.) Desr., *M. neapolitanus* Ten., *M. indicus* (L.) All., and *M. sulcatus* Desf. He also gives 2 keys, one, the more important one, for specimens in fruit, the other for specimens not in fruit. Notes on important characters and distribution are given under each species, and a special diagnosis is given of *M. neapolitanus* and *M. sulcatus*, the 2 rarest species.—*P. A. Rydberg.*

2016. CUTTING, E. M. **A new variety of Stachys sylvatica L.** Jour. Botany 59: 110–111. 1921.—*Stachys sylvatica* var. *immacutata*, native in England, is described as new to science.—*Adele Lewis Grant.*

2017. DRUCE, G. CLARIDGE. **Notes on the British orchids—chiefly the palmate section.** Bot. Soc. and Exchange Club British Isles Rept. 5: 149–180. *Pl. 10–18.* 1917 [1918].

2018. EAMES, EDWARD A. **An unusual form of Habenaria clavellata.** Rhodora 23: 126–127. *Pl. 131.* 1921.—A description is given of an abnormal form of this species in which the ends of the spurs are divided into 2 distinct lobes. This form of corolla was typical of a considerable portion of the plants throughout a large area. Whether this represents a true variety or merely a transitory variation remains to be determined by future observation of this colony.—*James P. Poole.*

2019. FARWELL, OLIVER A. **Corrections in nomenclature.** Rhodora 23: 86–87. 1921.—*Carex gigantea* Rudge has been adopted by certain authors for the plant named by L. H. Bailey *C. grandis*, the *C. gigantea* of Dewey. The author shows by a comparison of the achenes that the 2 are distinct species and proposes that these, together with *C. lupulina*, are best considered as varying forms of 1 widely distributed polymorphous species, which, according to the International Rules, should be known as *C. gigantea* Rudge, with the following variations: forma *minor* n. f.; var. *lupulina* (Muhl.) Farwell, forma *pedunculata* (Dew.) n. f.; forma *Bella-villa* (Dew.) n. f.; var. *grandis* (Bailey) n. var. The synonymy is given for the forms listed.—*James P. Poole.*

2020. FAWCETT, WILLIAM, AND A. B. RENDLE. **Notes on Jamaica plants.** Jour. Botany 59: 224–226. 1921.—The synonymy is given and the reasons for retaining the name *Triumfetta Bartramia* L. for the plant first described by Linnaeus as *Bartramia indica*. *Triumfetta Sloanei* is described as new to science, and *Corchorus acutangulus* is reduced to synonymy under *C. aestuans L.* [See also Bot. Absts. 6, Entry 395; 10, Entry 346.]—*Adele Lewis Grant.*

2021. GIUNG, NGUYEN THANH. **La détermination botanique des haricots exotiques.** [**The botanical determination of exotic beans.**] Compt. Rend. Acad. Sci. Paris 172: 1436–1438. 1921.—The seed characters by which *Phaseolus Mungo* and *P. aureus* may be distinguished are given.—*C. H. Farr.*

2022. GODFERY, M. J. **A new European Epipactis.** Jour. Botany 59: 101–106. 1921.—*Epipactis Muelleri*, hitherto confused with *E. viridiflora* Rchb., is described as a new species. —*Adele Lewis Grant.*

2023. GODFERY, M. J. **Epipactis leptochila Godf.** Jour. Botany 59: 146–147. 1921.—The author raises *Epipactis viridiflora* var. *leptochila* Godf. to the rank of a species, *E. leptochila*.—*Adele Lewis Grant.*

2024. GOOSSENS, M. **Contributions à l'étude du palmier à huile au Congo Belge: 7. Notes sur l'Elaeis guineensis L. var. idolatrica Chev. [Contributions to the study of the oil palm in Belgian Congo: 7. Notes on Elaeis guineensis var. idolatrica.]** Bull. Agric. Congo Belge 11: 54–58. *Fig. 13–16.* 1920.—The variety known as *idolatrica* has been described by various writers, but the specimens figured and photographed were always of young or male plants. The writer describes the fruit of a single tree with the leaf characters of var. *idolatrica*. These leaf characters always occur on isolated trees and he considers that this is a form rather than a true variety.—*E. M. Doidge.*

2025. GUSTAFSON, C. E. **Rubus Wahlenbergii Arrh. var. vestervicensis.** [Diagnosis in Latin; notes in German.] Bot. Notiser 1920: 211–212. 1920.—The variety is described as new to science.—*P. A. Rydberg.*

2026. HIERN, W. P. **New Ebenaceae from Portuguese Congo.** Jour. Botany 59: 128–129. 1921.—Three species are described as new to science: *Maba nutans, Diospyros diopa,* and *D. viridicans*.—*Adele Lewis Grant.*

2027. KNUCHEL, H. **Ein stolzer Mehlbeerbaum. [A remarkable mountain ash.]** Schweiz. Zeitschr. Forstw. 72: 20. *1 pl.* 1921.—An unusual specimen of *Sorbus* was found in the district of Altholz, Griesbach, at an elevation of 635 m. It resembles *Sorbus intermedia* and may be a cross between *S. aria* and *S. torminalis*. It has a diameter at breast height of 48–54 cm., clear length of 9 m., and a total height of 22 m.—*J. V. Hofmann.*

2028. MAIDEN, J. H. **The forest flora of New South Wales.** Vol. VII. Part 6. *P. 239–293, pl. 248–251, 9 photo. illus.* William Applegate Gullick: Sydney, April, 1921.—Eight species are treated in the present part, namely, *Eremocitrus glauca* Swingle, *Eucalyptus tessellaris* F. v. M., *Acacia cana* Maiden, *A. Loderi* Maiden, *Canthium oleifolium* Hook., *C. coprosmoides* F. v. M., *Eremophila maculata* F. v. M., and *E. longifolia* F. v. M. Each species is accompanied by a detailed description, one or more illustrations, and pertinent notes. A 2nd part to the chapter on Insects and Timber Trees appears in this number.—*Ibid.* Part 7. *P. 295–351, pl. 252–255, 6 photo. illus.* August, 1921.—In this part the following species are elaborated: *Duboisia myoporoides* R. Br., *D. Hopwoodii* F. v. M., *Eucalyptus globulus* Labill., *Acacia sentis* F. v. M., *A. Burrowi* Maiden, and *Tarrietia Argyrodendron* Benth. An appendix contains a chapter entitled A Tentative Bibliography of Eucalyptus Oil.—*Ibid.* Part 8. *P. 353–395, pl. 256–259, 8 photo. illus.* 1921.—This part treats the following species: *Livistona australis* Mart., *Eucalyptus robusta* Sm., *Nothofagus Moorei* (F. v. M.) Maiden, and *Daphnandra micrantha* Benth. A chapter is added in the appendix on The Cultivation of *Eucalyptus* in Countries Outside Australia.—*J. M. Greenman.*

2029. MOORE, SPENCER LEM. **Alabastra diversa. Part XXXIV. (1) Plantae Rogersianae VI.** Jour. Botany 59: 226–232. 1921.—This is a further installment regarding Archdeacon Roger's plants collected in Africa. The following species are described for the first time: *Pelargonium Rogersii, Rhus tumulicola, Combretum griseiflorum, Dactylopetalum Rogersii, Oldenlandia Rogersii, Felica homochroma, Euryops neptunicus, Senecio Breyeri, S. waterbergensis, Schizoglossum Theileri,* and *Selago Stewartii*. A new genus, **Tribulocarpus**, is described, to which *Tetragonia dimorphantha* is transferred as the type species. *Helichrysum Swynnertonii* S. Moore is reported for the 1st time from South Africa, and *Dicoma Kirkii* Harv. var. *microcephalus* is described as a new variety. A new Euphorbia is noted under the hitherto monotypic genus *Paivaeusa*, but, as only a fruiting specimen was seen, it was not described.—*Adele Lewis Grant.*

2030. PENNELL, FRANCIS W. **"Veronica" in North and South America.** Rhodora 23: 1–22. 1921.—The author revises the species of "Veronica" of both North and South America,

including the known naturalized species, and attempts to group the species in an evolutionary sequence. After discussing the critical characters in each of the genera and subgenera, and the age and distribution of various species, he gives a key to the genera and subgenera. The bibliography, synonymy, distribution, and discription of each of the species follows the key. The article is to be continued, this installment covering the genus *Veronicastrum* and the subgenus *Veronicella* of the genus *Veronica*. The species here treated are: *Veronicastrum virginicum* (L.) Farwell, *Veronica maritima* L., *V. spicata* L., *V. mexicana* S. Wats., *V. Copelandii* Eastw., *V. Cusickii* A. Gray, *V. fruticans* Jacq., *V. alpina* L., *V. Stelleri* Willd., *V. Wormskjoldii* Roem. & Schult., *V. Wormskjoldii nutans* (Bong.) Pennell comb. nov., *V. serpyllifolia* L., *V. serpyllifolia humifusa* (Dickson) Vahl., *V. peregrina* L., *V. peregrina xalapensis* (HBK.) Pennell, *V. arvensis* L., *V. agrestis* L., *V. polita* Fries, *V. persica* Poir., *V. biloba* L., *V. hederaefolia* L. A key to the latter group is given.—*James P. Poole.*

2031. PENNELL, FRANCIS W. **"Veronica" in North and South America.** Rhodora 23: 29–41. 1921.—This, the concluding portion of the revision of the species of "Veronica," covers the species of the subgenus *Euveronica*, as follows: *V. latifolia* L., *V. Chamaedrys* L., *V. javanica* Blume, *V. grandiflora* J. Gaertn., *V. officinalis* L., *V. Beccabunga* L., *V. americana* Schwein., *V. Anagallis-aquatica* L., *V. Anagallis-aquatica Brittonii* (Porter) Pennell comb. nov., *V. glandifera* Pennell, *V. catenata* Pennell sp. nov., *V. catenata glandulosa* (Farwell) Pennell comb. nov., *V. undulata* Wall., *V. scutellata* L. The article also covers the genus *Hebe*, with the following species: *H. salicifolia* (Forst.) Pennell comb. nov., *H. blanda* (Cheesm.) Pennell comb. nov., *H. elliptica* (Forst.) Pennell comb. nov. The article closes with a list of Nomina Excludenda.—*James P. Poole.*

2032. PETRIE, D. **Descriptions of new native flowering-plants.** Trans. and Proc. New Zealand Inst. 52: 17–19. 1920.—The following new species, varieties, and combinations are made: *Pittosporum Matthewsii*, *Uncinia longifructus* (Kük.), *Uncinia caespitosa* Col. var. *collina*, *Carex secta* Boott var. *tenuiculmis*, *Poa novae-zelandiae* Hackel var. *Wallii*.—*Wm. Randolph Taylor.*

2033. PFEIFFER, HANS. **Über die Stellung der Gattung Caustis R. Br. im natürlichen System. II. [On the position of the genus Caustis in the natural system.]** Ber. Deutsch. Bot. Ges. 38: 207–216. *Fig. 1.* 1920.—Having, in an earlier paper, given the grounds for including the genus *Caustis* in the Cyperaceae, the author in this paper deals with the position of the genus in the family. He concerns himself with 3 questions: Does *Caustis* belong to the tribe *Gahnieae?* Is this tribe to be retained unchanged or is it to be extended to include several other genera of the *Rhynchosporeae?* If the latter is the case, to what grouping of genera would its extended position most nearly correspond? Each of these questions is discussed at length. A very complete key to the genera is given, based mainly on the bristles of the spikelet and the fruit. The subfamily includes the tribes *Schoeneae*, *Rhynchosporeae*, and *Cladieae*; the genus *Caustis* is placed in the last mentioned tribe.—*P. B. Kennedy.*

2034. PITTIER, HENRY. **Notes on the genus Swartzia in Panama and Guatemala.** Jour. Washington [D. C.] Acad. Sci. 11: 155–160. 1921.—The genus is revised and the following species are described: *Swartzia panamensis* Benth., *S. simplex* Spreng., *S. arborescens* (Aubl.) Pittier, *S. trifolia* sp. nov., *S. myrtifolia* J. E. Sm., *S. darienensis* sp. nov., *S. guatemalensis* (Donn. Sm.) Pittier.—*Helen M. Gilkey.*

2035. PITTIER, HENRY. **Two new species of Bursera.** Jour. Washington [D. C.] Acad. Sci. 11: 229–230. 1921.—Both species, *Bursera panamensis* and *B. verapacencis*, are from Central America.—*Helen M. Gilkey.*

2036. POLE EVANS, I. B. **The Flowering Plants of South Africa.** 1: *Pl. 21–40.* 1921.—The number contains colored plates of *Pachypodium succulentum*, *Protea abyssinica*, *Bolusanthus speciosus*, *Acokanthera spectabilis*, *Cyrtanthus sanguineus*, *C. McKenii*, *C. obliquus*, *C. rotundifolius* sp. nov., *Stapelia Gettleffii*, *Streptocarpus Dumii*, *Senecio stapeliaeformis* sp. nov., *Nymphaea stellata*, *Ceropegia Meyeri*, *C. Rendallii*, *Moraea iridioides*, *Haemanthus*

natalensis, *Witsenia maura*, *Mimetes palustris*, *Orothamnus Zeyheri*, and *Sarcocaulon rigidum*. —*E. P. Phillips.*

2037. PUGSLEY, H. W. **A mountain form of Carex pulicaris.** Jour. Botany 59: 106–109 1921.—An unusual sedge growing on mountain cliffs in Great Britain is described as *Carex pulicaris* forma *montana*.—*Adele Lewis Grant.*

2038. PUGSLEY, H. W. **Spergularia marginata var. glandulosa Druce.** Jour. Botany 59: 130–131. 1921.—The author gives his reasons for maintaining that this is a good variety, and proposes *S. marginata* var. *glandulosa* forma *glabrescens* as a new form.—*Adele Lewis Grant.*

2039. PUGSLEY, H. W. **British forms of Jasione montana L.** Jour. Botany 59: 209–216· 1921.—Descriptions of the forms and varieties of *Jasione montana* L. are given, and *J. montana* forma *laevis* and *J. montana* var. *latifolia* are described as new.—*Adele Lewis Grant.*

2040. SAFFORD, WILLIAM E. **Synopsis of the genus Datura.** Jour. Washington [D. C.] Acad. Sci. 11: 173–189. *Fig. 1–3.* 1921.—The author describes the following species: *Datura Stramonium* L., *D. ferox* L., *D. quercifolia* HBK., *D. villosa* Fernald, *D. Metel* L., *D. innoxia* Mill., *D. meteloides* Dunal, *D. discolor* Bernh., *D. pruinosa* Greenm., *D. ceratocaula* Ort., *D. candida* (Pers.) Safford, *D. cornigera* Hook., *D. arborea* L., *D. versicolor* (Lagerh.) Safford, *D. mollis* sp. nov., *D. rubella* sp. nov., *D. suaveolens* Humb. & Bonpl., *D. affinis* sp. nov., *D. dolichocarpa* (Lagerh.) Safford, *D. longifolia* (Lagerh.) Safford, *D. aurea* (Lagerh.) Safford, *D. Pittieri* sp. nov., *D. sanguinea* Ruiz & Pavon, *D. Rosei* sp. nov. A key to the species of the sections *Stramonium*, *Dutra*, *Ceratocaulis*, and *Brugmansia* is given.—*Helen M. Gilkey.*

2041. SALMON, C. E. **Epipactis viridiflora Reichb.** Jour. Botany 59: 20–21. 1921.—This is an account of certain peculiar plants of *Epipactis* found in the counties of East and West Gloucester, and Monmouth, England, in 1920. They probably represent the typical *E. viridiflora*, and not forma *dunensis* or forma *vectensis*. Possibly they are var. *leptochila* of Godfery. The British forms of *Epipactis* may be arranged as follows: *E. viridiflora* Reichb. forma *vectensis* T. & T. A. Stephenson; var. *dunensis* (T. & T. A. Stephenson) n. comb.; and var. *leptochila* Godfery.—*K. M. Wiegand.*

2042. STEPHENSON, T., AND T. A. STEPHENSON. **Epipactis latifolia in Britain.** Jour. Botany 59: 33–39. *1 fig.* 1921.—This is a continuation of the discussion by the present and other authors of the status of forms related to *E. latifolia* All. The occurrence of *E. latifolia* in a locality where *E. viridiflora* did not occur showed that forms classed as *E. media* Fries are simply variations of *E. latifolia* and should be considered as such, not as hybrids. These plants were very variable and the different forms are discussed. Variation in flower color is not due to shade. It is shown that the name *E. media* Fries or Babbington is untenable.—*K. M. Wiegand.*

2043. STEPHENSON, T., AND T. A. STEPHENSON. **The forms of Orchis maculata.** Jour. Botany 59: 121–128. *1 pl., fig. 1–25, 2 text fig.* 1921.—The authors give a detailed discussion of the several forms of *O. maculata* L. occurring in Great Britain.—*Adele Lewis Grant.*

2044. STEPHENSON, T., AND T. A. STEPHENSON. **Epipactis viridiflora.** Jour. Botany 59: 205. 1921.—The note refers to Godfery (see Bot. Absts. 10, Entry 2023), transferring to *E. leptochila* Godfery the *f. vectensis* and *f. dunensis* as varieties of that species.—*S. H. Burnham.*

2045. THOMPSON, H. STUART. **Carex pulicaris forma montana.** Jour. Botany 59: 146. 1921.—The author adds further notes to H. W. Pugsley's description (see Bot. Absts. 10, Entry 2038) of this form.—*Adele Lewis Grant.*

2046. TURRILL, W. B. **Glechoma hederacea L. and its subdivisions.** Bot. Soc. and Exchange Club British Isles Rept. 5: 694–701. 1919 [1920].—A new form, *parvifolia*, from Berkshire, England, is included.—*G. C. Druce.*

2047. WALL, A. **Helichrysum dimorphum Cockayne—a hybrid?** Trans. and Proc. New Zealand Inst. 52: 106-107. 1920.—The writer visited the original localities from which this plant was obtained by Cockayne, and found it associated with *Helichrysum filicaule* and *H. depressum*. On the basis of morphological resemblances to the associated species, he would consider it a hybrid between them. In habit, *H. dimorphum* most resembles *H. filicaule* in infloresence, *H. depressum*. Extensions of range of the form are given.—*Wm. Randolph Taylor.*

2048. WIEGAND, K. M. **The genus Echinochloa in North America.** Rhodora 23: 49-65. 1921.—As the result of an extended investigation, the author publishes a treatment of this genus, for the region north of Panama, differing widely from the recent revision of the genus by Hitchcock (see Bot. Absts. 8, Entry 724). The characters used to define the groups are: Size and form of spikelets, size and nature of spinules, and length of anther. In the latter character, the results of several hundred measurements show a remarkable constancy of size for each species and variety. A key is given for the following species, varieties, and forms: *E. colonum* (L.) Link, *E. colonum* forma *zonalis* (Guss.) comb. nov., *E. zelayensis* (HBK.) Schult., *E. zelayensis* var. *macera* var. nov., *E. zelayensis* var. *subaristata* var. nov., *E. frumentacea* (Roxb.) Link, *E. crusgalli* (L.) Beauv., *E. crusgalli* forma *longiseta* (Trin.) Farwell, *E. muricata* (Michx.) Fernald, *E. muricata* var. *ludoviciana* var. nov., *E. muricata* var., *occidentalis* var. nov., *E. muricata* var. *microstachya* var. nov., *E. muricata* var. *multiflora* var. nov., *E. echinata* (Willd.) Beauv., *E. echinata* var. *decipiens* var. nov., *E. Walteri* (Pursh) Nash, *E. Walteri* forma *laevigata* forma nov., *E. oplismenoides* (Fourn.) Hitchcock, *E. Holciformis* (HBK.) Chase, *E. polystachya* (HBK.) Hitchcock, *E. guadeloupensis* (Hackel) comb. nov., *E. paludigena* sp. nov., *E. paludigena* var. *soluta* var. nov. The description, distribution, synonymy, and bibliography of each form is given, as well as many short discussions concerning relationships.—*James P. Poole.*

2049. WILMOTT, A. J. **Geranium purpureum T. F. Forster.** Jour. Botany 59: 93-101. 1921.—This is a discussion of the varieties of *Geranium purpureum* and *G. Robertianum* occurring in England. The *G. purpureum* of Forster is considered to be a variety and is named *G. purpureum* var. *Forsteri*. *G. Robertianum* var. *intermedium* is described as new.—*Adele Lewis Grant.*

MISCELLANEOUS, UNCLASSIFIED PUBLICATIONS

BURTON E. LIVINGSTON, *Editor*

SAM F. TRELEASE, *Assistant Editor*

2050. ANONYMOUS. **A new Natal sugar cane cutter.** South African Sugar Jour. 5: 713-715. *1 fig.* 1921.—An illustrated description and explanation is given of a sugar-cane cutting machine invented by Percy Woodland.—*C. Rumbold.*

2051. ANONYMOUS. **Endowment of scientific research in the United States.** [Rev. of: ANONYMOUS. **Funds available in 1920 in the United States of America for the encouragement of scientific research.** Nation. Res. Council [U. S. A.] Bull. 9. 1921.] Nature 107: 719-720. 1921.—Amount and distribution of funds, with some comment on similar work in Europe, are discussed.—*O. A. Stevens.*

2052. ANONYMOUS. **The alternation of generations.** Sci. Amer. Monthly 3: 405-408. 1921.

2053. BAÑO, JOSÉ DE. **Ultimos ensayos en la extraccion de la cera de candelilla.** [**Experiments in the extraction of wax from "candelilla."**] Rev. Agric. [Mexico] 5: 822-824. *2 fig.* 1921.—A method of obtaining a wax of high grade, free of all impurities, is described. The plant used is *Pedilanthus pavonius.*—*John A. Stevenson.*

2054. Cottrell, K. W. **Production of peat in 1920.** Jour. Amer. Peat Soc. 14[4]: 4-7. 1921.—The value in dollars of peat and peat moss used in the manufacture of peat products in the U. S. A. in 1920 was: Fertiliser and fertiliser ingredient, 773, 635; stock food, 143,047; fuel, 5,050; moss (largely for packing), 36,201.—*G. B. Rigg.*

2055. Georgeson, C. C. **Summary of the work at the stations.** Rept. Alaska Agric. Exp. Sta. 1918: 7-21. *Pl. 1-2.* 1920.—This report gives a brief review of the work done at the Rampert, Fairbanks, Matanuska, and Kodiak stations, and a brief summary of homesteads in Alaska.—*J. P. Anderson.*

2056. Georgeson, C. C. **Summary of work at the stations.** Rept. Alaska Agric. Exp. Sta. 1919: 7-19. *Pl. 1-2.* 1920.—This report gives a general survey and a review of the work done at the 5 experiment stations in Alaska. The reports, in the same volume, of the station superintendents describe the work in greater detail [see abstracts under Agronomy and Horticulture].—*J. P. Anderson.*

2057. Hill, C. L. **Combating marine borers in San Francisco Bay.** Intercoll. Forest Club Ann. 1: 38-42. *Fig. 2.* 1921.

2058. Kaiser, George B. **Little journeys into mossland. IV.—The luminous moss.** Bryologist 24: 41-43. 1921.—This is a popular account of a search for the luminous moss (*Schistostega osmundacea*) in Vermont and New Hampshire.—*E. B. Chamberlain.*

2059. Marchmay, T. A. **What is manna?** Sci. Amer. Monthly 3: 414. 1921.—A comparison is given of the different kinds of modern manna with the biblical food.—*Chas. H. Otis.*

2060. Martin, Edwd. A. **The generation of heathfires.** Nature 107: 811. 1921.—The author reports an area of peaty soil smoking from natural heat of the sun.—*O. A. Stevens.*

2061. Pearse, A. S. **Distribution and food of the fishes of Green Lake, Wis., in summer.** Bull. U. S. Bur. Fish. 37: 253-272. 1921.—Only a very small percentage of the direct food is composed of algae and other plants.—*T. C. Frye.*

2062. Platt, E. E. **List of food plants of some South African lepidopterous larvae.** South African Jour. Nat. Hist. 3: 65-138. 1921.—Two lists have been compiled, the 1st an alphabetical list of food plants, the 2nd a systemised list of the butterflies and moths, with the names of the food plants on which the corresponding larvae have been observed to feed.—*E. M. Doidge.*

2063. Ryan, Hugh. **The exploitation of Irish peat.** Nature 107: 728-730. *1 fig.* 1921.—Machinery for cutting and handling peat, illustrated by the Baumann automatic peat machine, is referred to.—*O. A. Stevens.*

2064. Schipper, W. W. **Het hard koken van erwten.** [**Hard boiling of peas.**] Cultura 33: 265-267. 1921.

2065. Williams, S. G. **Manufacture of rope and twine.** Sci. Amer. Monthly 3: 349-352. *9 fig.* 1921.—Treatment of Manila hemp, sisal, and jute in a modern rope factory is described. —*Chas. H. Otis.*

2066. Yuncker, T. G. **A handy method for the mounting of mosses.** Bryologist 24: 43-44. *3 fig.* 1921.—"The method consists of folding pieces of paper into the form of envelopes so that when mounted the specimen is held securely, is visible, and at the same time can be easily removed for further study."—*E. B. Chamberlain.*

INDEX TO AUTHORS' NAMES IN VOLUME X

(References are to entry numbers; an asterisk before a number signifies that the entry referred to is by citation only)